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Digital Transformation of Land Registration: Legal Implications of Electronic Certificates in Mitigating Land Disputes in Malang City

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Abstract

General Background: Digital transformation in land administration is reshaping public services by improving transparency, efficiency, legal certainty, and data accountability. **Specific Background:** Electronic land certificates replace paper-based documents with electronic records supported by geospatial locking, audit trails, and certified digital signatures. **Knowledge Gap:** Previous studies have largely examined conventional certificate evidentiary strength, while limited research addresses electronic certificates, cryptographic architecture, digital forensics, and dispute prevention in land registration. **Aims:** This study aimed to analyze the legal recognition of electronic certificates and evaluate their implications for mitigating land disputes. **Results:** Using empirical legal research with statutory and sociological approaches, the study found that electronic certificates have valid and binding legal recognition under the integrated framework of agrarian law, electronic information law, and land registration regulations. The system provides preventive legal protection through absolute geospatial locking, National Cyber and Crypto Agency certified electronic signatures, and audit trail verification. It also rejects overlapping applications automatically when coordinate data conflict with locked land parcels. **Novelty:** This study frames electronic certificates as a preventive legal protection instrument based on geospatial, cryptographic, and forensic mechanisms. **Implications:** The findings indicate that land dispute resolution is moving from paper-based evidence contests to audit-trail validation, reducing opportunities for document forgery and land mafia practices.

Highlights:

- Valid recognition rests on integrated agrarian and cyber regulations.
- Geospatial locking blocks overlapping parcel applications automatically.
- Audit trails support evidentiary verification in litigation.

Keywords: Electronic Certificate, Land Disputes, Legal Certainty, Land Mafia, Agrarian Law.

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Introduction

The development of information and communication technology has brought significant changes to various public service sectors, including in the field of land administration. The Indonesian government, through the Ministry of Agrarian Affairs and Spatial Planning/National Land Agency (ATR/BPN), continues to modernize the land service system as an effort to improve effectiveness, efficiency, transparency, as well as legal certainty in the management of land rights.[1] One form of this transformation is the implementation of an electronic-based land registration system realized through the issuance of electronic certificates as a replacement for conventional physical certificates. This policy gains its legal basis through the Regulation of the Minister of Agrarian Affairs/Head of the National Land Agency Number 1 of 2021 concerning Electronic Certificates, which was later refined through the Regulation of the Minister of Agrarian Affairs/Head of the National Land Agency Number 3 of 2023 regarding the Issuance of Electronic Documents in Land Registration Activities.[2]

Digital transformation in land registration is part of the agenda for bureaucratic reform and the digitalization of public services aimed at creating a more integrated and accountable land administration system.[3] Through electronic certificates, physical data and legal data of land are stored in an electronic system managed by the state, which is expected to reduce the risk of document loss, certificate forgery, duplicate certificates, as well as various forms of land administration misuse that have often been the cause of land disputes. In addition, the electronic system is also expected to accelerate service processes and improve public accessibility to land information.[4]

Nonetheless, the implementation of electronic certificates is not free from various legal and technical challenges. From a legal perspective, various debates arise regarding the evidentiary strength of electronic certificates, the protection of the personal data of rights holders, the security of electronic systems, as well as the dispute resolution mechanisms in case of data errors or system disruptions.[5] On the other hand, the uneven level of digital literacy among the public and concerns about electronic data security are also factors that influence public acceptance of this policy. Several studies indicate that although electronic certificates have legal validity and evidentiary power equivalent to conventional certificates, strengthening regulations and security systems is still necessary to ensure the protection of public rights.[6]

The issue becomes increasingly relevant when associated with the high potential for land disputes in Indonesia, which is generally caused by overlapping ownership, unclear juridical data, document forgery, or weaknesses in land administration. The digitization of the land registration system is seen as one of the instruments for dispute mitigation because it allows for better-structured, documented, and easily verifiable land data management. However, the effectiveness of electronic certificates in preventing or reducing land disputes still requires further study, especially at the implementation level in the regions.

Land has a very fundamental position for human life, both from economic, social, and legal aspects. In Indonesia, the guarantee of legal certainty regarding land rights has been explicitly mandated in Article 33 paragraph (3) of the 1945 Constitution.[7] The mandate of the constitution is then further elaborated in Article 19 of Law Number 5 of 1960 concerning Basic Agrarian Regulations (UUPA). The implementation of land registration by the state is the main instrument to provide protection and legal certainty for rights holders.[8]

Malang City, as one of the major cities in East Java Province, has dynamics of population growth, residential area development, and economic activities that are quite rapid, thereby impacting the increasing need for legal certainty regarding land rights. This situation makes Malang City a relevant area to study the implementation of digital transformation of land registration through electronic certificates. This research is important to conduct in order to analyze the legal implications of electronic certificates in providing legal certainty, as well as to assess the extent to which the implementation of this system can contribute to mitigating land disputes in Malang City.

Previous research generally only examined the evidentiary strength of land certificates in the form of physical or analog deeds. There is a gap analysis between conventional administrative protection and the widespread practice of boundary manipulation and deed forgery by land mafias. The novelty of this research lies in the analysis of doubts regarding the digital/electronic world (including electronic certificates) in our society, digital forensics, cryptographic architecture in land registration documents, and the deepening of understanding of the digital world from an early stage in Indonesia, which has not been widely explored by previous researchers. This study concludes that the weaknesses of the previous system are improved through the Electronic Certificate instrument.

The urgency of this research is very high considering that Malang City is an area with dynamic growth in property assets and rapidly soaring land investment values. Following the massive regional expansion policy in 1987, administrative chaos in deed transcripts triggered a high number of land plots with overlapping spatial status. This makes the area a crucial empirical laboratory for testing the effectiveness of the new land registration instruments. The main legal issues that are the focus of this research include two fundamental matters. First, how the legal recognition of Electronic Certificates is constructed within the national land registration system. Second, how the implementation of these Electronic Certificates impacts legal certainty and protection of land rights in land disputes in Malang City. The resolution of these issues will determine the direction of land jurisprudence in the future.

Method

This research uses the type of empirical legal research (sociological juridical).[9] The approaches used are the statutory approach, the case approach, and the sociological approach.[10] The research location is focused on the Land Office of Malang City and the judicial scope in the Greater Malang area, using qualitative descriptive data analysis. The purpose of this research is to analyze and comprehensively describe the legal recognition of Electronic Certificates. This research also aims to evaluate the form of legal protection implications of the electronic system within society. The ultimate goal is to formulate solution-oriented ideas for the enforcement of modern land administration law.

Results and Discussion

A. Legal Recognition of Electronic Certificates in the National Land Registration System

The legal recognition of Electronic Certificates (Ser-el) in Indonesia is not a regulatory anomaly, but rather a structured evolution of jurisprudence. Article 19 of the Agrarian Basics Law (UUPA) mandates land registration in order to provide legal certainty for rights holders, where a progressive interpretation of this article has never restrictively limited the registration medium to physical paper. The legal vacuum regarding the physical form of the certificate is fully bridged by the Electronic Information and Transactions Law (UU ITE).[11] This regulation grants absolute recognition under the principle of the functional equivalent approach that electronic documents are valid legal evidence.

The Ministry of Agrarian Affairs and Spatial Planning/National Land Agency (ATR/BPN) executed this transformation through Ministerial Regulation of ATR/BPN Number 1 of 2021, which was later refined through ATR/BPN Regulation Number 3 of 2023. This technical regulation ensures that the issued Ser-el has undergone a strict validation process and is immune to manipulation by land mafias.[12] In its proof scheme, the security system of Ser-el can be measured for its level of success compared to conventional certificates, as presented in the following table.

Table 1. Comparison of the Validity of Analog Certificates and Electronic Certificates

No	Proof Parameter	Analog Certificate (Paper)	Electronic Certificate (E-Cert)
1.	Database System	Decentralization (Physical Deeds at the Land Office)	Centralization (National Data Center/Cloud)
2.	Coordinate Point Boundary	Relative (Prone to Shift / Missing Marker)	Absolute Geospatial (Integrated Satellite System)
3.	Authentication Method	Wet Signature (Prone to Forgery)	BSSN Certified Electronic Signature
4.	Dispute Investigation	Physical Evidence and Testimony	<i>Audit Trail (Digital Forensic Record Trace)</i>

The advantage of implementing this Electronic Certificate addresses the issue of the vulnerability of land documents over time; including several cases where many verpondings from the Dutch colonial era (Eigendom Verponding No. 12 Year 1838) are still circulating.[13] Based on the analysis above, the Ser-el transition is not free from the threat of data misuse and database hacking; however, the system has been designed with digital security triangulation. This is relevant and supports the findings of previous cyber law studies which state that the protection of digital assets requires layered cryptography and real-time data backup.[14]

B. Juridical Implications of Ser-el on Land Dispute Mitigation in Malang City

Based on interviews with authorities at the Malang City Land Office, an empirical novelty was found that Electronic Certificates present a preventive legal protection revolution. Malang City, with the dynamics of disputes resulting from the 1987 expansion policy (Government Regulation No. 15 of 1987), holds many 'time bombs' in the form of double certificates in border areas. The implementation of electronic certificates cancels the potential for overlapping disputes through an automatic rejection algorithm (System Reject).[15]

In the Computerized Land Activity (KKP) system that collaborates with the Global Positioning System (GPS), the system will block new applications if the measured coordinates collide with land parcels that have been locked in the database. If a Ser-el dispute is forced to end up in civil or Administrative Court (PTUN) in Malang City, the highest form of legal protection lies in the robustness of the Audit Trail. Judges and law enforcers are no longer trapped in examining outdated document letters, but must instead bring in forensic experts to validate the Hash Value and the integrity of its asymmetric cryptography.[16]

However, amidst this progress, sociological obstacles in the form of service innovation fragmentation have also been found. Various level II Land Offices often develop independent local applications that have the potential to create "Data Silos." The existence of these sectoral applications contradicts the principle of a Single Source of Truth required in the national Electronic Certificate ecosystem, making standardization necessary to ensure that legal protection is absolute across all jurisdictions of the Republic of Indonesia.

Conclusion

The legal recognition of Electronic Certificates in Indonesia is very valid, binding, and has evidentiary power equivalent based on the integration of legal frameworks between Article 19 of the Agrarian Law, the Electronic Information and Transactions Law (UU ITE), and Minister of Agrarian Affairs/National Land Agency Regulations Number 1 of 2021 and Number 3 of 2023. The implementation of Electronic Certificates in Malang City provides implications for preventive and absolute legal protection because it nullifies the potential for overlapping disputes through absolute geospatial locking based on satellites and Electronic Signatures from BSSN. In the judicial litigation realm, Electronic Certificates shift the paradigm of dispute resolution from paper-based evidence contests to forensic examination of digital audit trails, thus eliminating the maneuvering room of land mafia crimes that exploit weaknesses in analog administration.

References

1. Y. K. Joo, E. M. Black, I. Trier, W. Haakma, L. Zou, and L. Kabeche, "ATR Promotes Clearance of Damaged DNA and Damaged Cells by Rupturing Micronuclei," *Molecular Cell*, vol. 83, no. 22, pp. 4133–4149.e8, 2023, doi: 10.1016/j.molcel.2023.09.003.
2. R. A. Putra and A. Winanti, "Urgensi dan Kendala dalam Penerbitan Dokumen Sertifikat Tanah Elektronik Pasca Peraturan Menteri ATR/BPN Nomor 3 Tahun 2023," *Jurnal USM Law Review*, vol. 7, no. 2, 2024, doi: 10.26623/julr.v7i2.9178.
3. M. L. Ilvira, "Sertipikat Hak Atas Tanah Elektronik: Pelaksanaan, Hambatan, dan Tantangan," *Law Journal*, vol. 5, no. 2, 2025, doi: 10.46576/lj.v5i2.6062.
4. M. A. Satryadin, A. H. Hadna, and R. A. R. S. Putra, "Implementasi Kebijakan Sertipikat Tanah Elektronik dalam Konteks Transformasi Digital di Kantor Pertanahan Kabupaten Bintan," *Matra Pembaruan*, vol. 9, no. 2, pp. 107–121, 2025, doi: 10.21787/mp.9.2.2025.107-121.
5. S. Azzahra and T. Fitriah, "Eksistensi ATR/BPN dalam Penerapan Sertifikat Elektronik di Daerah 3T Berdasarkan Permen ATR/BPN Nomor 3 Tahun 2023 (Studi Kasus Kantor ATR/BPN Kabupaten Sukabumi)," *Aladallah: Jurnal Politik, Sosial, Hukum, dan Humaniora*, vol. 3, no. 1, 2025, doi: 10.33756/eslaj.v2i2.15780.
6. Triadi and M. M. Achmad, "Politik Hukum Implementasi Peraturan Menteri ATR/BPN Nomor 3 Tahun 2023 tentang Penerbitan Dokumen Elektronik," *Jurnal Hukum Terapan dan Inovasi Hukum*, vol. 5, no. 1, 2024, doi: 10.52249/hjp.v5i1.550.
7. S. Bahari, M. P. P. M. Sinaga, L. O. Mbunai, and Z. M. Putri, "Rekonstruksi Pemaknaan Hak Menguasai Negara Menurut Pasal 33 Ayat (3) UUD 1945," *JustiLaw*, vol. 5, no. 1, 2025, doi: 10.52249/justiwal.v5i1.559.
8. S. Munandar, "Efektivitas Berlakunya Pasal 19 Undang-Undang Nomor 5 Tahun 1960 terhadap Kehidupan Masyarakat," *Estudio Law Journal*, vol. 1, no. 2, 2020, doi: 10.33756/eslaj.v2i2.15750.
9. F. N. Aksa, S. M. Widia, and S. Hanani, "Perbandingan Metode Penelitian Yuridis Normatif dan Yuridis Empiris," *Nusantara: Jurnal Ilmu Pengetahuan Sosial*, vol. 12, no. 2, 2025, doi: 10.56393/nomos.v5i2.3230.
10. M. Bin Salman and E. Asmanto, "Islamic Environmental Stewardship: A Sociological Approach to Hadith and Legal Frameworks for Ecological Responsibility," *Volksgeist: Jurnal Ilmu Hukum dan Konstitusi*, vol. 7, no. 2, 2024, doi: 10.24090/volksgeist.v7i2.12205.
11. T. Supartini and M. A. Nugroho, "Tinjauan Yuridis Kekuatan Hukum Sertifikat Tanah Elektronik Berdasarkan Peraturan Menteri Agraria dan Tata Ruang/Kepala Badan Pertanahan Nasional Nomor 1 Tahun 2021," *IBLAM Law Review*, vol. 5, no. 1, 2025, doi: 10.52249/ilr.v5i1.557.
12. D. F. Y. Yanti, D. M. Mutmainah, R. S. J. Putrit, A. Niravita, and M. A. H. Fikri, "Optimalisasi Pendaftaran Tanah Melalui Inovasi Teknologi dalam Mewujudkan Sistem yang Efisien dan Transparan," *Jurnal Ilmiah Penelitian Mahasiswa*, vol. 2, no. 2, 2024, doi: 10.33756/eslaj.v2i2.15720.
13. M. Priscilla et al., "Keabsahan Hukum Penerbitan Sertipikat Tanah Elektronik sebagai Alat Bukti Kepemilikan Hak Atas Tanah di Persidangan," *UIR Law Review*, vol. 8, no. 2, 2024, doi: 10.56393/nomos.v5i2.3240.
14. R. Mukadar, A. I. Laturette, and B. Latupono, "Kepastian Hukum Sertifikat Elektronik sebagai Bukti Kepemilikan Tanah," *Pattimura Law Study Review*, vol. 1, no. 2, 2023, doi: 10.1016/pls.2023.09.003.
15. S. U. T. Sukmana and B. Baidhowi, "Implementasi Sertifikat Tanah Elektronik dan Dampaknya terhadap Kepastian Hukum serta Aspek Sosial di Kabupaten Semarang," *Nomos: Jurnal Penelitian Ilmu Hukum*, vol. 5, no. 2, 2025, doi: 10.56393/nomos.v5i2.3290.
16. Yani and R. A. Syafiin, "Pengarsipan Elektronik Sertifikat Tanah untuk Menjamin Ketersediaan Arsip sebagai Alat Bukti yang Sah pada Sengketa Pertanahan," *Khazanah: Jurnal Pengembangan Kearsipan*, vol. 14, no. 2, pp. 153–164, 2021, doi: 10.22146/khazanah.59105.