

Digital Land Reform: The Impact of Indonesia's Electronic Land Administration System on Agrarian Governance

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ABSTRACT

Digital transformation in land administration has become one of the Indonesian government's strategic agendas in order to achieve more modern and accountable land governance. By implementing the Electronic Land Administration System (e-land system), the Ministry of Agrarian Affairs and Spatial Planning/National Land Agency (ATR/BPN) is striving to overcome classic problems in the land sector such as slow bureaucracy, overlapping certificates, land mafia practices, and weak legal certainty. This research employs a qualitative approach with policy analysis methods, utilizing secondary data such as regulations, official reports, academic literature, and media publications. The analysis results show that land digitalization has several positive impacts, including increased transparency, efficiency, accountability, and legal certainty in land management. Programs like PTSL, e-certificates, HT-el, and Roya-el accelerate services, reduce the potential for data manipulation, and strengthen the legal legitimacy of land rights. Nevertheless, the implementation of this policy still faces various challenges, ranging from the digital divide, limitations in technological infrastructure, human resource capacity, to data security issues. Thus, the success of digital agrarian reform depends not only on technology but also on efforts to ensure inclusiveness, strengthen digital literacy, and protect data. The e-land system has great potential to be an effective instrument for agrarian reform, as long as it is implemented evenly and fairly for all Indonesian people.

Keywords: Agrarian Governance, Agrarian Reform, Digitalization, E-Land System, Land Administration.

Introduction

Agrarian issues in Indonesia are a classic problem that has never been truly resolved. From the colonial era to the reform era, land governance has often been marked by ownership conflicts, overlapping certificates, convoluted bureaucracy, and land mafia practices (Purba, 2025; Rohadi, 2022). This condition not only creates legal uncertainty for the public but also erodes public trust in state institutions responsible for regulating and serving land affairs. In fact, land holds a strategic position in national development (Wahyudi, 2023), serving as an economic factor of production, a source of community well-being, and a symbol of identity and social justice.

In the face of this complexity, the Indonesian government, thru the Ministry of Agrarian Affairs and Spatial Planning/National Land Agency (ATR/BPN), is undertaking various reform efforts, including leveraging digital technology (Yusuf et al., 2019). The presence of the Electronic Land Administration System, or more commonly known as the electronic land administration system, is a significant milestone in the digital agrarian reform agenda (Susmana, 2025). This system aims to modernize land services thru data digitization, electronic certificate issuance, and the provision of online services that are more transparent, faster, and accountable.

This digitalization of land administration aligns with the global e-government agenda aimed at improving the quality of governance (Balaji, 2025). By applying the principles of transparency, efficiency, and accountability, the electronic system is expected to reduce corrupt practices, expedite public services, and minimize land conflicts that often arise from overlapping conventional administration. Furthermore, this system is also expected to

strengthen legal certainty over land, which is an important foundation for sustainable economic development and achieving agrarian justice (Boli & Hidayat, 2025; Kalyana & Budidarmo, 2025).

However, the implementation of the electronic land administration system in Indonesia is not without various challenges. The digital divide between urban and rural areas, limitations in technological infrastructure, uneven capacity of government officials, and data security issues are crucial concerns that need attention (Isma et al., 2025; Johannes, 2024; Zein & Septiani, 2024). Additionally, the paradigm shift from a manual system to a digital system also requires significant adaptation of bureaucratic culture and technological literacy within society.

Based on this context, this article attempts to examine how digital agrarian reform through the implementation of an electronic land administration system affects agrarian governance in Indonesia. The analysis focuses on the positive impacts generated, the obstacles encountered, and the policy implications that can strengthen future digital land transformation. Thus, this research is expected to contribute to the development of more transparent, inclusive, and equitable land governance in the digital age.

Research Method

This research uses a qualitative approach with policy analysis methods (Rosyada et al., 2025), as the main focus of the study is to understand the process, substance, and implications of implementing the Electronic Land Administration System (e-land system) on agrarian governance in Indonesia. The research data is entirely sourced from secondary data, including government legal and regulatory documents (Law No. 5/1960, Government Regulation No. 18/2021, and ATR/BPN Minister regulations), official reports from the ATR/BPN Ministry regarding PTSL and electronic certificates, academic literature related to agrarian reform and digital governance, and media news and publications regarding the implementation of digital land services. The data was analyzed through document analysis, with stages of data reduction, categorization, interpretation based on good governance and e-government theories, and drawing conclusions about the effectiveness and challenges of land digitalization in Indonesia (Setyawan et al., 2024; Widodo & Kusnan, 2023).

Results and Discussion

Digital Transformation in Land Administration

Digital transformation in land administration in Indonesia is a strategic step by the government to improve agrarian governance, which has long been plagued by classic problems. The land sector has long faced a number of challenges, ranging from slow and convoluted bureaucracy, overlapping land certificates, a weak recording system (Ngongo et al., 2023), to the widespread practice of land mafia that harms the community. This condition creates legal uncertainty, hinders investment, and weakens public trust in state institutions.

In response to these issues, the Ministry of Agrarian Affairs and Spatial Planning/National Land Agency (ATR/BPN) launched the Electronic Land Administration System (e-land system) (Diany et al., 2024). This system is designed to transform land services from a manual, physical document-based system to a digital system that is faster, more transparent, integrated, and accountable. Some of the main programs that are the pillars of land digitalization in Indonesia (Kusmiarto et al., 2021; Putri & Putri, 2024) include:

1. Systematic Complete Land Registration (PTSL), which is a national land certification program carried out massively to provide legal certainty over land ownership for all Indonesian citizens.
2. Electronic Certificates (e-certificates), which replace physical documents with digital ones to reduce the risk of forgery, loss, or damage.

3. HT-el (Electronic Mortgage Rights), which is the digitalisation of mortgage rights registration to simplify banking and credit processes.
4. Roya-el, which is an electronic mortgage rights cancellation service that streamlines bureaucracy and speeds up administrative processes.
5. Online Non-Tax State Revenue, which is a non-cash payment system for non-tax state revenue aimed at increasing the transparency and accountability of service costs.

This transformation is not merely about converting physical documents into digital ones, but also about reorganising the public service system to be more efficient, transparent, and oriented toward legal certainty. With the integration of the national database, it is hoped that land administration will be able to support the realisation of better land governance and prevent the abuse of authority in the land sector (Klimach et al., 2018).

Table 1. Land Digitalization Program in Indonesia

Program/Service	Main Goal	Main Impact
PTSL (Complete Systematic Land Registration)	Accelerate land certification throughout Indonesia	Increase legal certainty of land rights
Electronic Certificate (E-Certificate)	Replace physical documents with digital certificates	Reduce the risk of forgery, loss, and damage to documents
HT-el (Electronic Mortgage Right)	Digitize mortgage right registration	Accelerate credit services and increase bureaucratic efficiency
Roya-el	Electronic cancellation of mortgage rights	Cut bureaucracy and accelerate land services
PNBP Online	Non-cash payment system for land services	Increase transparency and accountability of state revenue

Source: Ministry of Agrarian Affairs and Spatial Planning/National Land Agency (2021); Government Regulation No. 18 of 2021; Ministerial Regulation No. 1 of 2021 (compiled by the author)

Positive Impact on Agrarian Governance

The implementation of the Electronic Land Administration System (e-land system) brings a number of significant positive impacts on agrarian governance in Indonesia. One of the most prominent impacts is the increased transparency in land services. With a digital system, the process of applying for certificates, registering encumbrances, and other services can be monitored more openly. The public can access information directly thru official channels, making the likelihood of illegal fees and data manipulation smaller (Wang & Lim, 2011). This transparency also strengthens the accountability of land institutions in the eyes of the public. Beside transparency, efficiency is also a key advantage. The manual system that previously took a long time for document management is now streamlined thru faster and more practical digital services. Administrative processes that previously required intensive face-to-face interaction can now be done online, thus saving time, cost, and effort for the public. This directly improves the quality of public services in the agrarian sector and supports the government's agenda of realizing a modern and responsive bureaucracy.

The next positive impact is increased accountability in land data governance. With a nationally integrated digital system, all land ownership data is recorded in a more secure and consistent electronic database. This mechanism makes data verification more accurate and facilitates oversight by the authorities. This accountability also strengthens the trust of investors and banking institutions, as clearer and more accountable land data will facilitate economic processes based on land collateral. Furthermore, the electronic land administration system also strengthens legal certainty. Digitally recorded land ownership with electronic certificates minimizes the risk of forgery, loss, or damage to documents. The validity of electronic certificates, which is regulated by official regulations, strengthens legal guarantees for landowners. This legal certainty is not only important for landowners but also has implications for broader economic stability as it serves as a foundation for development and

investment. Overall, the implementation of the electronic land system directly contributes to strengthening more transparent, efficient, accountable, and legally certain agrarian governance. This positive impact serves as an important foundation for digital agrarian reform, although it must be acknowledged that the success of this system heavily depends on the extent to which society can access and utilize it equitably.

Implementation Challenges

Although the digitalization of land administration brings many benefits, in practice there are still various challenges that hinder the effectiveness of this policy. The first challenge is the digital divide. Not all communities, especially in rural and remote areas, have adequate internet access or sufficient digital literacy skills. This condition has the potential to create new injustices, where urban communities find it easier to enjoy digital services than rural communities. The second challenge is the limitations of technological infrastructure. Implementing an electronic system requires stable internet network support, reliable servers, and a robust data security system. However, there are still areas with limited internet access, and cybersecurity issues remain a significant risk. Considering that land data is a vital national asset, protection against hacking threats and information leaks is crucial.

Additionally, the capacity of human resources (HR), both among ATR/BPN apparatus and the public, is still uneven. Many employees need to adapt to the digital system, while the general public also requires guidance to access electronic services. This is exacerbated by the cultural resistance to bureaucracy, where some officials are slow to accept changes from a manual to a digital system. Thus, while digital transformation has the potential to strengthen agrarian governance, its successful implementation is highly dependent on overcoming these obstacles thru improved access, infrastructure, digital literacy, and change management within the bureaucracy.

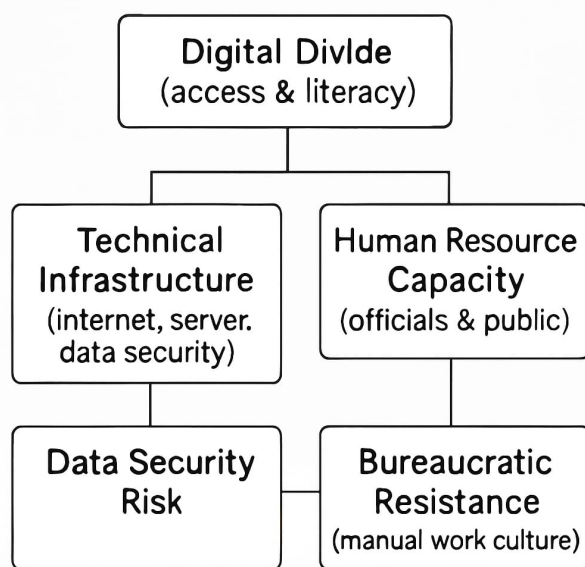


Figure 1. Schematic of e-Land System Implementation Challenges

Implications for Agrarian Reform

The digitalization of land administration thru the e-land system has broad implications for the agrarian reform agenda in Indonesia. From a governance perspective, this system strengthens the principles of good governance such as transparency, accountability, and effectiveness (Brinkerhoff, 2017; Johnston, 2006). More open and electronically based services help minimize corrupt practices while also increasing public trust in land agencies. Another

important implication is the strengthening of legal certainty. With the existence of electronic certificates, the risk of document forgery, loss, or damage can be reduced. This ensures that every land ownership right has strong legal legitimacy, thus supporting social and economic stability. This legal certainty also serves as an important foundation for supporting investment, infrastructure development, and safer land-based economic activities.

Additionally, digitalization opens up opportunities to accelerate the process of equalizing access to land rights. The Systematic Complete Land Registration Program (PTSL), supported by a digital system, allows for the accelerated issuance of land certificates to low-income communities. Ideally, this can strengthen the agrarian reform agenda in providing access to justice for all segments of society.

However, it should be noted that digitalization also brings new risks of injustice if access to electronic services is uneven. People in rural areas or vulnerable groups who lack digital literacy skills could be left behind in accessing their rights. Instead of strengthening agrarian justice, non-inclusive digitalization can actually deepen the gap between urban and rural communities. Thus, the implications of digital agrarian reform in Indonesia are two-sided: on the one hand, it can strengthen transparency, accountability, and legal certainty; on the other hand, it can present new challenges related to inclusivity and equitable access. Therefore, the success of digital agrarian reform depends on how the government not only builds electronic systems, but also ensures that these systems are accessible, understandable, and usable by all segments of society.

Policy Recommendations

To ensure that digital transformation in the land sector truly strengthens agrarian governance while supporting the agrarian reform agenda, a number of strategic policy steps are needed. First, the government needs to strengthen digital infrastructure down to rural and remote areas (Kelly & Hynes, 2018). Without stable and adequate internet access, communities in remote areas will become increasingly marginalized in accessing electronic land services. Second, increasing human resource (HR) capacity is crucial. ATR/BPN apparatus must be equipped with adequate digital skills to be able to operate the new system optimally. At the same time, society also needs to be encouraged to improve their digital literacy thru socialization programs, training, and mentoring. This effort is important so that digitalization is not only enjoyed by certain groups, but is truly inclusive for all segments of society.

Third, data security aspects must be placed as a top priority. Land data is one of the country's vital and highly valuable assets. Therefore, the government needs to build a strong cybersecurity system, including early detection mechanisms for potential hacking attacks and data breaches. Strengthening regulations regarding the protection of personal data is also an important part of maintaining public trust. Fourth, the government should continue to provide hybrid services, which are a combination of digital and manual services. This will ensure service inclusivity, especially for people who are not yet fully digitally literate. Hybrid services can also serve as a transitional bridge before the entire population becomes accustomed to using electronic systems fully.

Finally, continuous monitoring and evaluation of the e-land system implementation are necessary. This evaluation is crucial for identifying system weaknesses, measuring policy effectiveness, and serving as a basis for improvements. With regular evaluations, the government can ensure that land digitalization is not just a technological project, but truly becomes an instrument for realizing transparent, efficient, and just agrarian governance.

Conclusion

Digital transformation thru the implementation of the Electronic Land Administration System (e-land system) marks a new chapter in land governance in Indonesia. This policy was

born as a response to the classic problems of the land sector, which have long been synonymous with slow bureaucracy, land mafia practices, overlapping certificates, and weak legal certainty. Land digitalization is becoming an important instrument for realizing public services that are more transparent, efficient, accountable, and based on legal certainty. The discussion shows that the digital system is capable of bringing a number of real benefits, ranging from speeding up administrative processes and increasing data accuracy to strengthening the legal legitimacy of land ownership. The implementation of programs such as PTSL, e-certificates, HT-el, and Roya-el is a significant milestone in driving technology-based agrarian reform. Furthermore, digitalization also strengthens the principles of good governance by opening up wider access to information for the public and reducing the potential for abuse of power.

However, on the other hand, the success of land digitalization cannot be separated from a number of challenges that still loom. The digital divide, infrastructure limitations, unevenly distributed human resource capacity, and data security threats are crucial factors that need to be addressed immediately. Otherwise, digitalization risks creating new inequalities, where only certain groups have access to electronic services, while rural communities and vulnerable groups are left behind.

Therefore, digital agrarian reform must be understood as a process that not only emphasizes technological aspects, but also social, legal, and justice aspects. The government needs to ensure equitable digital infrastructure development, improve public digital literacy, strengthen data protection, and provide hybrid services as a transitional bridge. Furthermore, continuous monitoring and evaluation are needed so that this policy can be continuously improved according to field needs. Thus, the e-land system has great potential to become a strategic instrument for realizing more modern, transparent, and just agrarian governance. However, to truly align with the ideals of agrarian reform, land digitalization must be implemented inclusively so that it is accessible and its benefits are felt by all Indonesians, without exception.

Bibliography

- Balaji, K. (2025). E-Government and E-Governance: Driving Digital Transformation in Public Administration. *Public Governance Practices in the Age of AI*, 23–44.
- Boli, E., & Hidayat, M. N. (2025). Agrarian Law Reform in Indonesia: Between Legal Certainty and Social Justice. *Indonesian Civil Law Review*, 1(1), 53–68.
- Brinkerhoff, D. W. (2017). Accountability and good governance: concepts and issues. *International Development Governance*, 269–287.
- Diany, A. R., Ramli, A. M., Adolf, H., & Hasan, D. (2024). E-land registration system in Indonesia: policy, progress, and challenges. *International Journal of Public Law and Policy*, 10(4), 411–429.
- Isma, Y. S., Kardiati, D., Muslem, M., Fadhillah, S. K., KN, J., Akmal, F., & Chairunnisak, S. (2025). Transformasi digital sebagai instrumen untuk memperluas aksesibilitas layanan publik. *Journal of Administrative and Social Science*, 6(2), 66–77.
- Johannes, R. A. (2024). Optimalisasi Smart ASN dalam mendukung transformasi birokrasi di era digital di Provinsi Sulawesi Utara. *Jurnal Ilmiah Administrasi Pemerintahan Daerah*, 16(2), 151–165.
- Johnston, M. (2006). Good governance: Rule of law, transparency, and accountability. *New York: United Nations Public Administration Network*, 1, 32.
- Kalyana, L., & Budidarmo, W. (2025). Dynamics of Land Ownership Rights in the Perspective of Indonesian Agrarian Law in the Perspective of Legal Certainty and Social Justice. *JOSH: Journal of Sharia*, 4(02), 234–243.

- Kelly, W., & Hynes, M. (2018). Remotely connected?: A comparative analysis of the development of rural broadband infrastructure and initiatives. In *Service Provision and Rural Sustainability* (pp. 142–161). Routledge.
- Klimach, A., Dawidowicz, A., & Żróbek, R. (2018). The Polish land administration system supporting good governance. *Land Use Policy*, 79, 547–555.
- Kusmiarto, K., Aditya, T., Djurdjani, D., & Subaryono, S. (2021). Digital transformation of land services in indonesia: A readiness assessment. *Land*, 10(2), 120.
- Ngongo, Y., DeRosari, B., Basuki, T., Njurumana, G. N., Nugraha, Y., Harianja, A. H., Ardha, M., Kustiyo, K., Shofiyati, R., & Heryanto, R. B. (2023). Land cover change and food security in central Sumba: challenges and opportunities in the decentralization era in Indonesia. *Land*, 12(5), 1043.
- Purba, J. D. (2025). *Rekonstruksi Regulasi Digitalisasi Akta Pertanahan yang dibuat oleh Pejabat Pembuat Akta Tanah (PPAT) dalam Memberikan Layanan Publik Berbasis Nilai Keadilan*. Universitas Islam Sultan Agung.
- Putri, A. I. E., & Putri, N. D. R. (2024). Concepts and Challenges in Digitalizing the Land Management System in Indonesia. *Notaire*, 7(1).
- Rohadi. (2022). *Rekonstruksi Regulasi Perlindungan Hukum terhadap Pemilik Tanah yang Telah Bersertifikat sebagai Upaya Pencegahan Mafia Tanah Berbasis Keadilan*. Universitas Islam Sultan Agung.
- Rosyada, F. S., Nurlaela, S., Sukadi, S., & Yuniasih, A. W. (2025). Model Kemitraan Berkelanjutan pada Usahatani Penangkaran Benih Padi di Desa Blimbing Kecamatan Sambirejo Kabupaten Sragen. *JIA (Jurnal Ilmiah Agribisnis): Jurnal Agribisnis Dan Ilmu Sosial Ekonomi Pertanian*, 10(1), 1–9.
<https://doi.org/https://doi.org/10.37149/jia.v10i1.1502>
- Setyawan, R., Raharjo, B., & Dewayani, J. (2024). Governance in the digital era: Analyzing the adoption of e-government services in local authorities through quantitative methods. *Journal of Management and Informatics*, 3(3), 434–450.
- Susmana, D. S. (2025). Transformasi Digital Dalam Administrasi Pertanahan: Analisis Yuridis Terhadap Sertipikat Tanah Elektronik. *Jurnal Impresi Indonesia*, 4(6), 2063–2070.
- Wahyudi, W. (2023). Kedudukan Hukum Tukar Menukar Tanah Aset Desa Bagi Kepentingan Strategis Nasional. *Mendapo: Journal of Administrative Law*, 4(1), 46–62.
- Wang, Z., & Lim, N. (2011). The use of official and unofficial channels in government-citizen communication in China. *Electronic Journal of E-Government*, 9(1), pp79–91.
- Widodo, J., & Kusnan, K. (2023). Mapping and Analyzing E-Government Sentiments in Local Governments in Indonesia. *Society*, 11(2), 434–457.
- Yusuf, A. P., Ibrahim, M. A., & Syahribulan, S. (2019). Reformasi Birokrasi Dalam Pelayanan Publik Pada Kantor Agraria Dan Tata Ruang/Badan Pertanahan Nasional (Atr/Bpn) Kabupaten Maros. *Societas: Jurnal Ilmu Administrasi Dan Sosial*, 8(1), 9–21.
- Zein, H. M. H. M., & Septiani, S. (2024). *Digitalisasi Pemerintahan Daerah: Katalis Untuk Integrasi dan Optimasi Good Governance*. Sada Kurnia Pustaka.