

THE PROBLEM OF LEGAL CERTAINTY IN THE PRACTICE OF LAND RIGHTS TRANSFER IN INDONESIA: AN ANALYSIS OF THE LAND REGISTRATION SYSTEM

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Abstract

Land registration is a fundamental instrument in realizing legal certainty for land ownership in Indonesia. However, the implementation of the land registration system still faces various fundamental problems, such as delays in registration, overlapping certificates, weak accuracy of physical and juridical data, and land mafia practices that undermine the integrity of land administration. This condition creates a gap between the legal framework regulated in UUPA No. 5 of 1960 and Government Regulation No. 24 of 1997 and the reality of practice in the field, so that legal certainty in the transfer of land rights has not been effectively guaranteed. This study aims to analyze the effectiveness of the land registration system in Indonesia in ensuring legal certainty on the transfer of rights, as well as identifying the normative and empirical challenges faced. The research method uses a normative-empirical approach with descriptive-analytical analysis techniques through regulatory review, case studies of land disputes, and related academic literature. The results of the study show that the weakness of the negative publication system with a positive tendency, the limitation of digitization of land services, and the lack of optimal coordination across institutions are the main factors that hinder legal certainty. This article offers recommendations for the reconstruction of the land administration system through accelerating the digitization of e-land registration, strengthening data verification mechanisms, harmonizing customary law and positive law, and reforming the publication system towards a positive publication model to improve legal protection for land rights holders. The research findings are expected to contribute to the development of more accountable and sustainable land policies in Indonesia.

Keywords: legal certainty, land registration, transfer of rights, UUPA, e-land registration

Introduction

Land is a vital asset for human life and the development of a country (Masruron & Safitri, 2025). In Indonesia, with a population of more than 270 million, the need for land continues to increase in line with economic growth and urbanization (Masruron & Safitri, 2025). According to data from the Central Statistics Agency (BPS), Indonesia's population growth rate reaches 1.25% per year, which has implications for increasing demand for land for settlements, industry, and infrastructure (Masruron & Safitri, 2025). In a global context, the World Bank's Ease of Doing Business Index in 2020 ranked Indonesia 73rd out of 190 countries. One of the indicators that still needs to be improved is the ease of property registration, where Indonesia is ranked 106th (Doshi et al., 2019). This shows that there are challenges in the land administration system that need to be overcome to increase the competitiveness of the national economy.

The land registration system in Indonesia is regulated in the Basic Agrarian Law (UUPA) No. 5 of 1960 and Government Regulation No. 24 of 1997 concerning Land Registration. The main purpose of this system is to guarantee legal certainty over land ownership. However, in its implementation, there are still various problems that hinder the achievement of this goal. Data from the Ministry of Agrarian and Spatial Planning/National Land Agency (ATR/BPN) shows that until 2021, only around 60% of the total land plots in Indonesia have been registered. This figure indicates that there is still a lot of land that does not have legal certainty, which has the potential to cause conflicts and land disputes (Hariyanto et al., 2024). Problems in the land registration system in Indonesia include various aspects, ranging from unclear land status, overlapping ownership claims, to complicated and time-consuming bureaucratic processes (De Nicola et al., 1998). According to the Ombudsman of the Republic of Indonesia's report, the land sector is consistently one of the top five sectors with the most reported maladministration, with an average of 10% of the total annual reports (Cook, 2020).

Several previous studies have examined certain aspects of the land registration system in Indonesia. For example, a study by Sumardjono (2018) discusses land policy between regulation and implementation, while Harsono (2019) focuses on aspects of agrarian law in the context of national law. However, there are still gaps in a comprehensive analysis that integrates legal, social, and technological aspects of the land registration system. Research gaps that have not been adequately addressed include critical evaluation of the effectiveness of the land registration system in ensuring legal certainty, especially in the context of the transfer of land rights. In addition, there has been no in-depth analysis of the impact of information technology developments on the modernization of the land registration system in Indonesia, as well as its implications for legal certainty and efficiency of the rights transfer process.

Based on the urgency and problems that have been presented, this study aims to critically analyze the land registration system in Indonesia, focusing on the aspect of legal certainty in the transfer of land rights. This study will explore the existing legal framework, its implementation in the field, as well as the potential for innovation to improve the effectiveness and efficiency of the system. The results of the research are expected to make a significant contribution to the development of better land policies in Indonesia.

Method

This study employs a qualitative socio-legal research method, combining normative legal analysis with an empirical understanding of the dynamics of land registration practices. The socio-legal approach was chosen to critically examine the interaction between the legal framework governing land registration—such as the Basic Agrarian Law (UUPA) No. 5 of 1960, Government Regulation No. 24 of 1997 concerning Land Registration, and BPN technical regulations and the practical implementation of land registration and transfer of rights in society. The research focuses on analyzing issues of legal certainty in the transfer of land rights, including procedural problems, administrative barriers, overlapping certificates, and the role of digitalization (e-land registration). The scope of the study covers practices and policies administered by the National Land Agency (BPN/ATR) and relevant stakeholders such as PPAT, notaries, and land registry officials.

Data were collected through document studies of statutory regulations, BPN technical documents, court decisions related to land disputes, and empirical reports regarding administrative constraints and maladministration cases. To deepen the analysis, semi-structured interviews were conducted with PPAT professionals, land administration practitioners, and community representatives, selected through purposive and snowball sampling to access individuals directly involved in land transfer processes. Data were analyzed using descriptive-analytical techniques supported by legal theory and socio-administrative perspectives, particularly legal certainty theory and governance theory in land administration systems. This analytical approach makes it possible to uncover the gap between regulatory design and practical implementation, and to formulate recommendations for strengthening legal certainty through digital system reforms and institutional modernization.

Result and Discussant

Normative Framework of the Land Registration System in Indonesia

Land registration is a crucial aspect of the land system in Indonesia that aims to realize legal certainty and legal protection for land rights holders. The main legal basis that regulates land registration in Indonesia is the Basic Agrarian Law (UUPA) No. 5 of 1960, Government Regulation (PP) No. 24 of 1997 concerning Land Registration, as well as

various technical regulations issued by the National Land Agency (BPN). These three components of law are interrelated and form a comprehensive regulatory framework in regulating the land registration process in Indonesia. UUPA No. 5 of 1960 became the fundamental foundation in land law in Indonesia. This law regulates the basic principles of land control, ownership, and utilization in Indonesia. In the context of land registration, the UUPA stipulates the government's obligation to carry out land registration throughout Indonesia. Article 19 of the UUPA explicitly states that to ensure legal certainty, the government conducts land registration throughout the territory of the Republic of Indonesia in accordance with the provisions regulated by government regulations (Hariyanto et al., 2024).

As a follow-up to the mandate of the UUPA, the government then issued Government Regulation No. 24 of 1997 concerning Land Registration. This regulation provides more detailed and technical rules regarding the implementation of land registration. Government Regulation No. 24 of 1997 defines land registration as a series of activities carried out by the government continuously, continuously, and regularly, including the collection, processing, bookkeeping, and presentation and maintenance of physical data and juridical data, in the form of maps and lists, regarding land plots and flats, including the issuance of a certificate of proof of rights for plots of land that already have rights and property rights to flats and certain rights that burden it (Liu et al., 2024). To complete and detail the implementation of land registration, the National Land Agency (BPN) as the authorized institution in land affairs, issued various technical regulations. These regulations cover aspects such as measurement and mapping procedures, land administration standards, and technical instructions for the implementation of land registration. This BPN technical regulation is an operational guide for officers in the field in carrying out land registration tasks.

The main purpose of land registration, as stipulated in Indonesian positive law, is to provide legal certainty and legal protection to land rights holders. The legal certainty in question includes certainty regarding the subject of rights (rights holders), the object of rights (location, boundaries, and land area), and the type of land rights (Paccoud et al., 2021). With the land registration, land rights holders obtain strong proof of ownership in the form of land certificates (Thamrin et al., 2021). This certificate serves as a strong proof of land ownership, thus providing legal guarantees to the owner against interference or claims from other parties.

Legal protection provided through land registration includes protection against arbitrary actions from other parties, including the government. With the registration of a plot of land, the owner has valid proof and is recognized by the state for his ownership (Paccoud et al., 2021). This minimizes the potential for land disputes and provides a solid basis for

the owner to defend his rights. In addition, land registration also facilitates a more efficient land administration process, such as in terms of taxation, spatial planning, and infrastructure development (Beg, 2021).

In the context of the types of rights that must be registered, Government Regulation No. 24 of 1997 stipulates several types of land rights that must be registered. This includes Property Rights, Business Use Rights, Building Use Rights, Use Rights, Management Rights, Waqf Land, Ownership Rights to Flats, Dependent Rights, and State Land (Yusgiantoro et al., 2023). Each of these types of rights has different legal characteristics and provisions, but all of them must be registered in order to obtain legal recognition and protection from the state.

Property Rights are the hereditary, strongest, and fullest rights that people can have over land. This right gives the owner the authority to use the land according to his will, as long as it does not conflict with the public interest and applicable laws and regulations. Property Registration is very important because it provides the strongest guarantee of legal certainty to the owner.

Right to Use Business (HGU) is the right to cultivate land that is directly controlled by the state for a certain period of time for the purposes of agricultural, fishery, or livestock companies. HGU registration is important to ensure that land use is in accordance with the purpose of granting rights and to set a time limit for the use of the land (Fox et al., 2019). Building Use Rights (HGB) is the right to erect and own buildings on land that does not belong to them for a certain period of time. HGB registration ensures clarity of the legal status of buildings erected on the land and regulates the legal relationship between HGB holders and landowners.

The right to use is the right to use and/or collect the proceeds of land directly controlled by the state or land owned by another person, who gives the authority and obligations specified in the grant decision or in the agreement with the landowner (Lute et al., 2017). Registration of Right to Use is important to protect the interests of rights holders and landowners, as well as to ensure the use of land in accordance with the agreed provisions. Land registration also includes Management Rights, which are the right to control from the state whose enforcement authority is partially delegated to the holder (Hapsari et al., 2021). Waqf land, which is proprietary land that has been separated from personal property as religious property intended for the purpose of worship or other public interests in accordance with the teachings of Islam, must also be registered to ensure its validity and legal protection.

Ownership Rights over Flats Units is the right of ownership of apartment units or flats, which must also be registered to provide legal certainty to the owner (Terrefe, 2020). Meanwhile, the Right of Dependency, which is a security right charged on the right to land, must also be registered to protect the interests of creditors and debtors in land security loan transactions. State Land, although not a right to land, also needs to be registered to effectively inventory and manage state assets. State Land Registration is important to prevent misuse and ensure its use is in accordance with the public interest (Alden Wily, 2018).

In addition to the types of rights that must be registered, another important aspect of the land registration system is the mechanism of transfer of rights. The transfer of land rights can occur through various means, such as buying and selling, grants, inheritances, exchanges, and others. Each form of transfer of rights has specific legal procedures and requirements, but all of them must be registered to ensure their legality and legal certainty. In the case of land purchase and sale, the process of transferring rights begins with the making of a Deed of Sale and Purchase (AJB) in front of the Land Deed Making Officer (PPAT). This AJB then became the basis for the registration of transfer of rights at the land office (Thamrin et al., 2021). This process involves verifying documents, checking the validity of transactions, and finally recording the transfer of rights in the land book and certificate.

The transfer of rights through grants also requires an act made by PPAT. In this case, the grantee (grantor) must meet certain conditions, such as legal proficiency and legal ownership of the donated land. After the grant deed is made, the registration process for the transfer of rights is carried out at the land office (Dewi et al., 2025). Land inheritance is a form of transfer of rights that occurs due to the law when the right holder dies. In these cases, the heirs must register the transfer of the right by including an inheritance certificate, death certificate, and other supporting documents (Coletta & Cleland, 2001). This process is important to ensure that the rights to the land legally pass to the rightful heirs.

Land swapping is also a form of transfer of rights that requires registration. This process involves the exchange of ownership between two or more plots of land. The deed of exchange made by PPAT is the basis for the registration of the transfer of rights at the land office. Any form of transfer of rights must be registered at the land office to ensure its validity and legal certainty. This registration of transfer of rights is important to update land ownership data, prevent disputes in the future, and ensure that the land administration system remains accurate and up-to-date. In a broader context, an effective and comprehensive land registration system has significant implications for a country's economic and social development. Legal certainty over land ownership encourages

investment, facilitates access to credit by using land as collateral, and supports better development planning. In addition, a good land registration system also contributes to the reduction of land conflicts and the improvement of more transparent and accountable land governance.

However, the implementation of the land registration system in Indonesia still faces various challenges. One of them is the complexity of the existing land system, including the existence of customary law systems that are still valid in several regions. In addition, limited resources, both in terms of technology and human resources, are also an obstacle in realizing an efficient and comprehensive land registration system. To overcome these challenges, the Indonesian government continues to strive to improve the land registration system. This includes modernizing the land administration system through digitizing land data and maps (Judijanto et al., 2023), increasing the capacity of human resources in the land sector, as well as simplifying land registration procedures to improve community accessibility to land services. Land registration is a fundamental aspect of the land system in Indonesia which is governed by a comprehensive legal framework, including UUPA No. 5 of 1960, Government Regulation No. 24 of 1997, and various BPN technical regulations. The main goal is to provide certainty and legal protection for land rights holders. Different types of land rights must be registered, and the mechanism for the transfer of rights must follow established procedures to ensure its validity and legal certainty. Despite still facing various challenges, the land registration system continues to be developed as an integral part of efforts to realize better land governance in Indonesia.

The Problem of Legal Certainty in the Practice of Land Rights Transfer

Land registration is a crucial aspect of the land system that aims to provide legal certainty and protection of land rights for owners. Theoretically, land registration should run smoothly, accurately, and efficiently to ensure legal certainty. However, in practice, there are various obstacles and problems that cause a gap between theory and implementation in the field (Khanal et al., 2017). One significant difference between the theory and practice of land registration is the issue of registration delays. Ideally, the land registration and registration process should be carried out quickly and on time according to the established procedures (Sen et al., 1988). However, in reality, there are often delays in the recording process caused by various factors such as limited human resources, systems that have not been well integrated, or even practices that are not transparent in the administrative process.

This delay in recording can have various negative impacts. First, this can result in legal uncertainty for the legal landowners. When the registration process is late, the landowner may not have strong proof of ownership, making them vulnerable to other parties' claims

or even land grabbing. Second, delays in recording can also hinder the process of land transactions, such as buying and selling or transferring rights, because the status of land ownership becomes unclear. Another problem that often arises in the practice of land registration is disputes due to overlapping certificates. Theoretically, the land registration system should be able to prevent overlapping ownership by verifying and carefully examining the physical and juridical data of land (Thamrin et al., 2021). But in practice, there are still often cases where one plot of land has more than one valid certificate of ownership.

The overlap of these certificates can occur due to various factors, such as errors in soil measurement and mapping, inaccuracies in the data used in the registration process, or even the practice of manipulation of documents by irresponsible parties. As a result, complex land ownership disputes arise and have the potential to lead to prolonged conflicts between parties claiming to be the rightful owners (Holler et al., 2024). In addition, administrative issues are also one of the differences between the theory and practice of land registration. Theoretically, the land administration system should run efficiently, transparently, and accountably. However, in practice, there are often various administrative obstacles that hinder the land registration process.

These administrative problems can be in the form of convoluted procedures, complicated bureaucracy, or even corrupt practices in the process of managing land documents. This not only slows down the land registration process, but can also incur additional costs that should not be borne by the community. As a result, many landowners are reluctant or even unable to register their land officially (Innes, 1997). The factors that cause the weak legal certainty in the land registration system also need to be analyzed in depth. One of the main factors is the lack of accuracy of physical data and soil juridical data. Physical data includes information about the location, boundaries, and area of the land, while juridical data includes information about the legal status of the land, rights holders, and other rights that burden it.

Inaccuracies in physical data can occur for various reasons, such as the use of outdated measurement technology, errors in the mapping process, or even data manipulation by certain individuals. Meanwhile, inaccuracies in juridical data can be caused by irregular recording systems, loss of important documents, or the practice of document forgery. This lack of data accuracy has a very serious impact on legal certainty. When the physical and juridical data are inaccurate, the land certificate produced is also unreliable as proof of legal ownership. This can trigger land disputes, both between individuals and between communities and the government or private companies (Van Dijk, 2007). Another factor that contributes to the lack of legal certainty is the practice of land mafia and document manipulation. Land mafia refers to groups or networks that engage in illegal practices related to land transactions and ownership (Cleveland et al., 2009). They often take

advantage of loopholes in the land registration system to commit various unlawful acts, such as falsifying documents, bribing officials, or even intimidating legitimate landowners.

This land mafia practice not only harms individual landowners, but also undermines the integrity of the land registration system as a whole (Onyango, 2024). They create legal uncertainty by manipulating data and documents, making it difficult to determine the legal ownership of a piece of land. As a result, many land dispute cases have arisen and are difficult to resolve due to conflicting evidence. The limitations of the land registration digitization system are also a factor that weakens legal certainty. In the digital era like now, the land registration system should be integrated online and can be easily accessed by the public. But in reality, many regions in Indonesia still use manual or semi-digital systems in the land registration process.

This limitation of digitalization causes the land registration process to be slow, prone to errors, and difficult to access by the wider community (Hasan et al., 2024). In addition, systems that are not digitally integrated also open up opportunities for data and document manipulation. As a result, legal certainty over land ownership becomes weak because existing data cannot be verified quickly and accurately (Stefanovic et al., 2022). To give a more concrete picture of the impact of the weaknesses of the land registration system, we can look at some case studies or examples of land disputes that have occurred as a result of these problems. One of the most famous examples is the case of a land dispute in South Meruya, West Jakarta.

This case began with an overlap of land certificates between South Meruya residents and PT. Portanigra, a property development company. South Meruya residents have been occupying and owning certificates for the land since the 1960s. However, in the 1980s, PT. Portanigra claimed ownership of the same land based on the certificate they owned. This dispute has been going on for decades and involves thousands of heads of families. The lengthy and complicated legal process points to weaknesses in the land registration system, where two parties can have a valid certificate for the same land (Iryana & Mustofa, 2023). This case also revealed indications of land mafia practices involving document manipulation and abuse of authority by relevant officials. Another example is the case of a land dispute in Kampar Regency, Riau, involving indigenous peoples and oil palm plantation companies (Yusnidar et al., 2024). Indigenous people claim that the land is customary land that they have managed for generations. However, plantation companies have a Right to Use (HGU) issued by the government on the same land.

This case shows that there are problems in the recognition and recording of customary rights in the land registration system. The unclear status of customary lands and weak legal protection for indigenous peoples have led to prolonged conflicts. This also reveals

the gap between customary law and positive law in the land system in Indonesia. The two case examples above illustrate how weaknesses in the land registration system can lead to complex and difficult disputes to resolve. This not only harms the parties directly involved, but also has a negative impact on economic development and social stability in society. To overcome various problems in the land registration system, comprehensive and sustainable efforts are needed. First, the government needs to improve the land administration system, including improving the accuracy of physical and juridical land data. This can be done through the use of modern technologies such as geographic information systems (GIS) and satellite imagery for more accurate mapping of the land (Buonanno et al., 2015).

Second, it is necessary to strengthen the legal system and law enforcement to eradicate land mafia practices and document manipulation (Snyder et al., 2025). This includes providing strict sanctions against individuals involved in illegal practices related to land, as well as increasing supervision of the land registration process. Third, accelerating the digitalization of the land registration system must be a priority. The implementation of a nationally integrated electronic land registration system will increase efficiency, transparency, and accuracy in the land registration process. This system will also make it easier for the community to access land information and check the status of the land independently. Fourth, there needs to be harmonization between customary law and positive law in the land system (Dhiaulhaq & McCarthy, 2019). The recognition and protection of indigenous peoples' land rights needs to be integrated into the formal land registration system to prevent conflicts between indigenous peoples and other parties. Fifth, increasing the capacity of human resources in the land sector is also crucial (Dhiaulhaq & McCarthy, 2019). Ongoing training and education for land officers will enhance their competence in dealing with various aspects of land registration, including the use of modern technology and an understanding of the complexities of land law. Finally, active participation from the community is needed in the land registration process. Education and socialization about the importance of land registration need to be carried out massively to increase public awareness (Nabil et al., 2024). In addition, the government also needs to open a space for dialogue and consultation with the community in the development of land policies. By implementing these measures consistently and sustainably, it is hoped that the gap between the theory and practice of land registration can be reduced. This will ultimately increase legal certainty in the land system, reduce the potential for land disputes, and support sustainable economic development in Indonesia. In a broader context, improvements to the land registration system will also contribute to the achievement of sustainable development goals, particularly in terms of poverty alleviation, inequality reduction, and sustainable urban and community development. With a strong and reliable land registration system,

communities will have better access to productive assets (Petrov et al., 2024), which in turn can improve well-being and reduce socioeconomic disparities.

Reconstruction of the Land Registration System to Ensure Legal Certainty

The land system in Indonesia has undergone significant development since the enactment of the Basic Agrarian Law (UUPA) in 1960. However, along with the increasing complexity of land problems, there is an urgent need to improve land regulations and systems. One of the crucial aspects that needs attention is the integration of information technology-based land data, or known as e-land registration (Destiani & Mufiidah, 2024). This system is expected to increase efficiency, transparency, and accuracy in land data management. The implementation of e-land registration is a strategic step in modernizing land administration in Indonesia (Lengoiboni et al., 2019; Rose, 2005). This system allows for the digitization and integration of land data from various sources, including the National Land Agency (BPN), notaries, Land Deed Making Officials (PPAT), and judicial institutions. With this integrated system, it is hoped that it can minimize overlapping data, reduce the potential for land disputes, and accelerate the process of land services to the community.

The National Land Agency (BPN) as a government institution responsible for land administration has a central role in the implementation of e-land registration. BPN needs to upgrade information technology infrastructure, standardize land data, and increase the capacity of human resources to manage this system. In addition, BPN must also coordinate with relevant agencies such as the Ministry of Agrarian Affairs and Spatial Planning to ensure the synchronization of policies and regulations that support the implementation of e-land registration. Notaries and Land Deed Making Officials (PPAT) also have an important role in maintaining legal certainty in the land system. As public officials who are authorized to make authentic deeds related to the transfer of land rights, notaries and PPAT must ensure the validity and legality of every land transaction. In the context of e-land registration, notaries and PPATs need to adapt to digital systems, including the use of electronic signatures and electronic document storage. This will facilitate the real-time verification and validation process of land data.

Judicial institutions also play a crucial role in maintaining legal certainty in the land sector. The court is responsible for resolving land disputes that cannot be resolved through non-litigation channels. With e-land registration, judicial institutions can gain faster and more accurate access to land data, thereby speeding up the dispute resolution process. In addition, court decisions related to land cases also need to be integrated into the e-land registration system to ensure consistency and legal certainty. One of the important aspects of the land system in Indonesia is the implementation of a negative publication system with a positive tendency (Thamrin et al., 2021). This system basically

provides protection to rights holders whose names are listed on the certificate, but still opens up opportunities for other parties to file lawsuits if they feel they have stronger rights. The critical question that arises is whether this system is enough to protect society, or whether there needs to be a shift to a purely positive publication system (Kälin & Künzli, 2019).

The system of negative publications with a positive tendency has the advantage of providing flexibility to make corrections to errors in land registration (Thamrin et al., 2021). However, this system also has drawbacks, especially when it comes to providing absolute legal certainty to certificate holders. In practice, there are still frequent land disputes even though there is a certificate issued by BPN. This creates legal uncertainty and can hinder investment in the property sector. On the other hand, a purely positive publication system provides a guarantee of stronger legal certainty to certificate holders (Thamrin et al., 2021). In this system, the state guarantees the correctness of the data listed in the certificate and is responsible for losses arising from errors in land registration. However, the implementation of a purely positive publication system also has challenges, especially related to the readiness of infrastructure and human resources in BPN.

To strengthen legal certainty in the transfer of land rights, a series of normative and practical recommendations are needed. From a normative point of view, it is necessary to revise laws and regulations related to land, including the UUPA and Government Regulations on Land Registration. This revision must include aspects related to the implementation of e-land registration, strengthening the publication system, and legal protection for land rights holders (Thamrin et al., 2021). One important recommendation is to strengthen the position of land certificates as strong evidence. This can be done by clarifying the provisions regarding the deadline for filing a lawsuit against the certificate that has been issued (Correia, 2019). For example, it can be stipulated that after a certain period of time (e.g. 5 years) from the issuance of the certificate, no party can challenge the validity of the certificate unless it can prove the existence of forgery or fraud in the land registration process.

In addition, there needs to be a clearer arrangement regarding the responsibility of the state in the event of an error in land registration. This is important to provide legal protection to people who are victims of administrative errors. These arrangements should include a fair and transparent redress mechanism, as well as procedures for correcting inaccurate land data. From a practical point of view, the implementation of e-land registration must be supported by an adequate improvement of information technology infrastructure. This includes the development of an integrated database system, a reliable data communication network, and a robust data security system to prevent data manipulation and leakage. BPN needs to work with the Ministry of Communication and

Information Technology and other related institutions to ensure the availability of the necessary infrastructure.

Increasing the capacity of human resources is also a crucial aspect in the implementation of e-land registration. BPN needs to conduct intensive training for its employees, especially related to the use of information technology and understanding of aspects of land law. In addition, there needs to be an educational program for the community to improve their understanding of the land system and their rights as land rights holders. Coordination between institutions also needs to be improved to ensure the effectiveness of the implementation of e-land registration. BPN must coordinate intensively with notaries, PPAT, judicial institutions, and other government agencies related to land administration. This can be done through the formation of a cross-sectoral coordination team tasked with monitoring and evaluating the implementation of e-land registration on a regular basis.

In the context of strengthening the publication system, there needs to be an in-depth study of the possibility of a gradual shift towards a positive publication system. This study must consider various aspects, including infrastructure readiness, legal implications, and socioeconomic impacts. If the results of the study show that the positive publication system is more suitable for the Indonesian context, then it is necessary to prepare a clear roadmap for the transition from a negative publication system with a positive tendency to a purely positive publication system. The implementation of a positive publication system must be balanced with the strengthening of the mechanism for verifying and validating land data. BPN needs to develop a system that can detect and prevent attempts to falsify or manipulate land data (Kanwal et al., 2020). This can be done through the application of blockchain technology or similar technology that can guarantee the integrity and authenticity of data.

Another important aspect that needs to be considered is the protection of the rights of indigenous peoples and local communities in the context of land administration. E-land registration must be able to accommodate the diversity of the existing tenure system in Indonesia, including the customary land ownership system. This requires a more flexible approach to land registration, as well as the recognition of non-formal proof of land ownership. To strengthen legal certainty in the transfer of land rights, there needs to be standardization of the procedures and documents needed in the process of transfer of rights. This includes the preparation of a standard format for the transfer of rights deed, as well as the establishment of clear and uniform document requirements throughout Indonesia. This standardization will facilitate the verification process and reduce the potential for errors in the registration of transfer of rights.

Strengthening the land dispute resolution mechanism is also an important aspect in maintaining legal certainty. In addition to litigation in court, there needs to be the development of alternative dispute resolution mechanisms that are more effective and efficient. This could include strengthening the role of mediation and arbitration in resolving land disputes, as well as the establishment of special land courts to handle complex cases. The implementation of e-land registration must also pay attention to the aspect of personal data protection. Given that these systems will store and manage sensitive data related to land ownership, there needs to be a robust mechanism to protect the privacy of landowners. This includes the application of personal data protection principles, such as access restrictions, data encryption, and consent mechanisms from data owners.

In the context of the transfer of land rights, there needs to be a clearer arrangement regarding the roles and responsibilities of notaries and PPAT. This includes standardization of deed making procedures, data verification obligations, and accountability mechanisms in the event of errors or violations in the making of deeds. This arrangement is important to prevent practices that can harm the community, such as the creation of fictitious deeds or the manipulation of data in the deed of transfer of rights. Another important aspect that needs to be considered is the integration of land data with other spatial data, such as spatial data and environmental data. This integration is important to ensure that the transfer of land rights is in accordance with the spatial plan and does not violate environmental protection provisions. This requires close coordination between BPN and other related agencies, such as the Ministry of Environment and Forestry and local governments.

To support the implementation of e-land registration and strengthen legal certainty in the transfer of land rights, there needs to be adequate budget support from the government. This includes allocating funds for the development of information technology infrastructure, increasing the capacity of human resources, and socialization to the community (Riksfardini, 2023). In addition, there needs to be an effective monitoring and evaluation mechanism to ensure that the implementation runs in accordance with the set plans and targets. In the long term, strengthening the land system in Indonesia must be directed at the creation of an integrated and comprehensive single land administration system (Abikoye et al., 2024). This system must be able to accommodate various aspects of land administration, including land registration, land assessment, spatial planning, and natural resource management. With an integrated system, it is hoped that it can improve the efficiency of land administration and provide stronger legal certainty for the community.

The implementation of these recommendations certainly requires a strong commitment from all stakeholders, including the government, legislative institutions, legal practitioners, and the public. A holistic and gradual approach is needed to ensure that land system change can run effectively without causing social upheaval. Thus, it is hoped that the land system in Indonesia can provide stronger legal certainty, support economic development, and ensure the protection of people's rights to land.

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