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## **Legality of Boundary Designation and Boundary Approval in Integrated Systematic Land Registration**

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### **ABSTRACT**

This study aims to determine the legality of boundary demarcation in land measurement for integrated comprehensive systematic land registration activities, and how boundary demarcation and land ownership are protected in land measurement for integrated comprehensive systematic land registration activities. This study uses a normative legal research method. The methods used are the statutory approach and the conceptual approach. The legal materials used are primary, secondary, and tertiary legal materials. The techniques used to collect legal materials were literature study and prescriptive analysis. The government, through Regulation of the Minister of Agrarian Affairs and Spatial Planning/Head of the National Land Agency Number 6 of 2018, launched the Complete Systematic Land Registration (PTSL) program as an accelerative measure to realize legal certainty and protection for all land rights holders. The results of the study show that the legality of boundary markers is in an ambiguous position. The available protection is also not explicitly regulated, either in preventive or repressive forms, leaving the potential for criminalization of parties who do not have a direct interest in the land.

**Keywords:** Boundary Witness Legality, Integrated PTSL, Legal Protection, Legal Certainty, Agrarian Law

### **1. INTRODUCTION**

Land administration plays a fundamental role in ensuring legal certainty, preventing land disputes, and supporting sustainable development planning. In Indonesia, land governance is normatively anchored in the Basic Agrarian Law of 1960 (Undang-Undang Pokok Agraria/UUPA), which establishes principles of justice, legal certainty, and orderly land administration. Nevertheless, despite the normative clarity provided by the UUPA, practical implementation remains challenged by complex social structures,

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diverse customary land systems, and overlapping sectoral regulations. These conditions often create gaps between legal norms and empirical realities, particularly in the determination of land boundaries as a core element of land registration.

Rapid population growth, dynamic land-use change, and the increasing economic value of land have further intensified the urgency of reforming Indonesia's land administration system. Comprehensive and integrated land registration is no longer merely an administrative necessity but a strategic requirement to reduce agrarian conflicts, enhance investment certainty, and protect land rights for all citizens. In this context, the Complete Systematic Land Registration Program (Pendaftaran Tanah Sistematis Lengkap/PTSL), introduced through Regulation of the Minister of Agrarian Affairs and Spatial Planning/National Land Agency Number 6 of 2018, represents a major policy initiative aimed at accelerating land certification nationwide (Kusumawardani & Siska, 2023).

PTSL is positioned as an integral component of Indonesia's national agrarian reform agenda, emphasizing inclusivity and equitable access to land assets. The program targets the systematic registration of all land parcels across the country through integrated physical and juridical data collection. As of the end of 2023, approximately 113 million land parcels had been registered out of the national target of 126 million by 2025, demonstrating significant progress while simultaneously revealing persistent technical and social obstacles, particularly in rural areas. These obstacles include limited technical capacity in land measurement, inadequate infrastructure in remote regions, and low levels of legal awareness among landowners.

One of the most critical issues in PTSL implementation concerns the determination of land boundaries. Empirical studies indicate that a lack of public understanding regarding boundary demarcation frequently leads to overlapping claims and land disputes. Although boundary markers and boundary agreements (*contradictorie delimitatie*) are

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designed as preventive mechanisms, their effectiveness largely depends on the legal status and competence of the parties involved in boundary designation. Several scholars have emphasized that weak community participation and insufficient legal literacy undermine the sustainability of boundary certainty (Supadno R. and Mujiati, M., 2023).

From a normative perspective, Government Regulation Number 24 of 1997 explicitly stipulates that boundary determination must be conducted based on the designation by the land right holder or their authorized representative and, where possible, approved by adjacent landowners. This regulation embodies the principle of legal certainty and due process in land boundary adjudication. However, the technical guidelines of Integrated PTSL expand the category of boundary witnesses to include “any person who knows the boundary,” even if they are not the landowner or legal proxy. While administratively pragmatic, this regulatory expansion raises fundamental legal questions regarding legitimacy, accountability, and the evidentiary strength of boundary determinations (Zulfikar, 2024).

This normative inconsistency creates a legal ambiguity that potentially weakens the juridical validity of land measurement results. Boundary witnesses who lack formal legal standing may face legal risks if disputes arise, while landowners themselves may suffer from reduced protection due to inaccurate or contested boundaries. Previous studies on PTSL have largely focused on program acceleration, efficiency, or general legal principles of land registration, leaving a significant research gap concerning the legality of boundary designation and the simultaneous legal protection of boundary witnesses and landowners (Parapat & Kurniawan, 2021).

Statistical data further underscore the urgency of this issue. In 2023 alone, more than 8,300 agrarian disputes were recorded nationwide, with approximately 27 percent attributed to unclear land boundaries (Statistik, 2024). This figure highlights that boundary determination is not merely a technical matter, but a core legal issue with

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profound social and economic implications. Accelerated certification without adequate legal safeguards risks producing land titles that are vulnerable to legal challenges, undermining the very objective of legal certainty promoted by PTSL.

Technological advancements, such as the use of Geographic Information Systems (GIS) and integrated village land maps, offer promising tools to enhance boundary accuracy and administrative efficiency (Panjaitan et al., 2023). Nevertheless, technology alone cannot resolve normative inconsistencies or substitute for clear legal accountability. Legal harmonization, institutional clarity, and community participation remain indispensable components of sustainable land governance.

Against this backdrop, this study examines the legality of boundary designation and boundary approval within the framework of Integrated PTSL, as well as the extent of legal protection afforded to boundary witnesses and landowners. The research contributes theoretically by refining the application of legal certainty and legal protection theories in modern land administration, and practically by offering policy-oriented recommendations to strengthen regulatory coherence and safeguard rights in systematic land registration.

## **2. RESEARCH METHOD**

This research applies a normative legal research method to examine the legality of boundary designation and boundary approval within the framework of Integrated Complete Systematic Land Registration (PTSL). The focus of the study is on the analysis of legal norms, regulatory coherence, and juridical implications arising from the implementation of land registration policies (Mertokusumo, 2009).

A statutory approach is employed to analyze laws and regulations governing land registration and boundary determination, particularly the Basic Agrarian Law, Government Regulation Number 24 of 1997 on Land Registration, and regulations of the Minister of Agrarian Affairs and Spatial Planning/National Land Agency related to PTSL.

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This approach is used to assess normative consistency, hierarchical conformity, and potential regulatory gaps affecting legal certainty (HS & Nursyahbani, 2019). The study also utilizes a conceptual approach by examining legal doctrines and principles such as legal certainty, legal protection, and *contradictoire delimitatie*. These concepts serve as analytical tools to evaluate the legal status of boundary witnesses (*penunjuk batas*), the binding force of boundary approval, and the extent of protection afforded to landowners in the PTSL process.

Legal materials in this research consist of primary legal materials (statutory regulations), secondary legal materials (legal literature, scholarly journals, and previous research), and tertiary legal materials (legal dictionaries and official reports). Data are collected through library research, involving systematic identification and classification of relevant legal materials. The analysis is conducted using qualitative juridical analysis with a prescriptive-analytical orientation, aiming not only to describe existing legal norms but also to evaluate their adequacy and formulate normative recommendations. The scope of the research is limited to normative analysis; however, empirical data from official institutions are used as supporting information to contextualize the findings (Fajar & Achmad, 2015).

### **3. RESULTS AND DISCUSSION**

#### **The Legal Validity of Boundary Designation and Boundary Approval within the Integrated Complete Systematic Land Registration System**

The legal validity of boundary designation within the land registration system constitutes a fundamental element in ensuring legal certainty over land rights. Land registration in the Indonesian agrarian law system is not merely understood as an administrative activity; rather, it functions as a legal instrument of the state to provide legal certainty and legal protection to land rights holders, as mandated by Law Number 5

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of 1960 concerning Basic Agrarian Principles (Kamungnay et al., 2025). Consequently, every stage of land registration, including boundary designation and boundary approval, must be grounded in clear, valid, and consistent legal norms. From a theoretical perspective, the principle of legality requires that every act of government administration derive its authority from valid legal norms situated within the hierarchy of laws and regulations. Hans Kelsen, through his theory of *Stufenbau des Recht*, emphasizes that the validity of a legal norm is determined by its conformity with higher-ranking norms. In the context of land registration, the Basic Agrarian Law serves as the foundational norm that legitimizes all policies and administrative actions in the field of land affairs, including the measurement and determination of land parcel boundaries (Krismantoro, 2024).

Operational regulations concerning land boundary designation are further governed by Government Regulation Number 24 of 1997 on Land Registration. Article 17 of this regulation explicitly stipulates that boundary designation shall be carried out by the holder of the land right or their authorized representative, with due regard to the approval of owners of adjoining land parcels (Setiadi et al., 2019). This provision reflects the application of the principle of *contradictoire delimitatie*, namely that boundary determination must be conducted openly, participatively, and based on mutual agreement among interested parties. This principle serves a preventive function in avoiding boundary disputes from the earliest stage of land registration. However, in its implementation through the Integrated Complete Systematic Land Registration (PTSL) policy, significant normative dynamics have emerged. The Technical Guidelines for Integrated PTSL issued by the Ministry of Agrarian Affairs and Spatial Planning/National Land Agency expand the category of boundary designators by allowing “any person who knows the boundaries of the land parcel” to act as a boundary witness (Ardani, 2019). This policy is driven by the need to accelerate national land registration and by the social reality that landowners are not always present at the time measurements are conducted.

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From the perspective of public administration, such an approach may be understood as an effort to enhance efficiency in public service delivery. From a legal standpoint, however, the expansion of boundary designators raises issues of legality, as it is not accompanied by clear regulation concerning the juridical capacity, authority, and legal responsibility of non-owner boundary witnesses. This condition potentially undermines legal certainty, which constitutes the primary objective of land registration. Lon L. Fuller, through his theory of the internal morality of law, asserts that a sound legal norm must satisfy the principles of clarity, consistency, and non-contradiction. The lack of synchronization between Government Regulation Number 24 of 1997 and the Technical Guidelines for Integrated PTSL demonstrates a normative disharmony. On the one hand, the government regulation affirms the legitimacy of land rights holders as boundary designators; on the other hand, technical policies expand this role without reinforcing norms of legal responsibility. Such a condition contradicts the principles of consistency and legal clarity (Bahmid et al., 2023).

Van Apeldoorn's conception of legal certainty is also relevant in examining this issue. Legal certainty does not merely require the existence of written rules, but also demands consistency in their application. The unclear legal status of non-owner boundary designators potentially generates legal uncertainty regarding the results of land boundary measurements. Such uncertainty may affect the evidentiary strength of land title certificates issued on the basis of those boundary data. Beyond boundary designation, boundary approval occupies a strategic position within the land registration system. Boundary approval constitutes a form of legal acknowledgment by owners of adjacent land parcels regarding the results of boundary designation and measurement. In land law doctrine, boundary approval functions as both a social and legal legitimacy of physical land data.<sup>9</sup> Without valid boundary approval, measurement results are susceptible to dispute and may become a source of future land conflicts (Juriyah et al., 2024).

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In the practice of Integrated PTSL, boundary approval is often carried out in an administrative and formalistic manner, without adequate legal understanding on the part of the involved parties. In many cases, boundary approval is granted without the direct presence of landowners or without sufficient explanation of its legal consequences. This condition potentially weakens legal protection for landowners and contradicts the objective of land registration to ensure legal certainty and legal protection. The legal implications of weak boundary designation and boundary approval validity are significant. Land title certificates issued on the basis of juridically defective boundary data are vulnerable to challenge through civil litigation or administrative court proceedings. This demonstrates that accelerated land registration without strengthening procedural legality may, in fact, generate new forms of legal uncertainty (Kholifah & Parmono, 2024).

Advancements in land measurement technology, such as the use of photogrammetry and geographic information systems within Integrated PTSL, have indeed improved the technical accuracy of measurements. However, technology cannot replace legal and social legitimacy in the processes of boundary designation and approval. Spatial data that are technically accurate still require a strong legal foundation to possess valid evidentiary force. Based on the foregoing analysis, the findings of this study indicate an urgent need for regulatory harmonization between Government Regulation Number 24 of 1997 and the Technical Guidelines for Integrated PTSL. The reaffirmation that boundary designation should ideally be performed by land rights holders or legally authorized parties must serve as a guiding principle. Should the involvement of non-owner parties remain necessary, it must be accompanied by clear regulation concerning juridical capacity, legal responsibility, and mechanisms for protecting landowners' rights (Prima & Moeis, 2024).

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Accordingly, this Chapter III affirms that the legal validity of boundary designation and boundary approval constitutes a key element in ensuring legal certainty in land registration. Without strengthening this aspect of legality, Integrated PTSL risks producing land title certificates that are juridically weak and prone to dispute, thereby undermining the objectives of land registration as mandated by the Basic Agrarian Law and Government Regulation Number 24 of 1997.

### **Legal Implications and Legal Protection for Boundary Designators and Land Rights Holders within an Integrated, Complete Systematic Land Registration**

Legal protection constitutes the foundational pillar of the implementation of the Integrated Complete Systematic Land Registration (PTSL) program, as it is through this instrument that the state fulfills its obligation to guarantee the recognition, certainty, and protection of land rights for its citizens. From the perspectives of administrative law and agrarian law, legal protection is not confined to the mere existence of written norms; rather, it encompasses the institutional mechanisms that ensure every stage of land policy is implemented in a fair, transparent, and accountable manner. Philipus M. Hadjon conceptualizes legal protection in two principal forms: preventive and repressive legal protection. Preventive legal protection aims to avert legal violations through clear and procedurally sound administrative regulation, while repressive legal protection functions to resolve disputes or legal violations after they have occurred. This analytical framework is particularly relevant in the context of PTSL, which positions the state as the central actor in structuring and registering land rights (Aristo & Mujiburohman, 2023).

The urgency of legal protection within Integrated PTSL cannot be separated from the character of land as a strategic resource endowed with economic, social, and cultural value. Land is not merely a legal object but constitutes the material basis of social life; consequently, any legal uncertainty regarding ownership status or boundary demarcation

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carries the potential to trigger both horizontal and vertical conflicts. Data released by the Ministry of Agrarian Affairs and Spatial Planning/National Land Agency (ATR/BPN) in 2024, recording more than 3,200 active land dispute cases nationwide, predominantly caused by overlapping boundaries and weak ownership documentation demonstrate that legal protection remains a significant challenge. In this context, PTSL is positioned as a state instrument to fulfill the constitutional mandate of Article 28D paragraph (1) of the 1945 Constitution, which guarantees every person the right to recognition, legal certainty, protection, and fair treatment before the law (Pasamai & Salle, 2024).

From a theoretical standpoint, legal protection in Integrated PTSL is closely intertwined with the principle of the rule of law, which places law at the center of governance. This principle requires regulations that are consistent, accessible, and applied in a non-discriminatory manner. Within the land registration system, the rule of law is operationalized through an administrative framework that ensures clarity regarding legal subjects, legal objects, and the legal relationships governing land. When land registration processes are conducted in an orderly and predictable manner, legal certainty transcends normative abstraction and becomes a tangible reality experienced by society. Accordingly, Integrated PTSL should not be understood merely as a program for accelerating land certification, but rather as part of a broader state strategy to reinforce the legal legitimacy of land tenure and ownership (Nasional, 2024).

Legal protection in PTSL is also inseparable from the dynamics of policy change and administrative practice in the land sector. One of the most critical issues concerns the expansion of the definition of boundary designators in the 2023–2025 Integrated PTSL Technical Guidelines, which no longer restricts this role exclusively to landowners but extends it to other parties deemed knowledgeable about land boundaries. This policy shift carries significant legal implications, particularly with respect to legitimacy and legal responsibility. While the expansion is intended to expedite measurement processes, it

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simultaneously opens space for administrative errors that may affect the validity of land certificates. In this context, legal protection becomes a crucial instrument to ensure that every role involved in PTSL is grounded in clear legal authority and does not generate new forms of legal uncertainty (Rachmawati, 2021).

The dimension of legal protection within Integrated PTSL is also closely connected to the principles of good governance. Transparency, accountability, and public participation are decisive elements in determining the quality of legal protection in land administration. The government, through the Ministry of ATR/BPN, has promoted the implementation of a digital land administration system based on geospatial data to enhance transparency and measurement accuracy. The integration of digital technology is expected to reduce the potential for data manipulation and strengthen administrative accountability. Nevertheless, technology can only function effectively when supported by an adaptive legal framework and adequate oversight mechanisms.

In practice, challenges to legal protection in PTSL often arise from the gap between legal norms and implementation realities. Although Government Regulation Number 24 of 1997 on Land Registration provides a clear procedural framework, its implementation on the ground is frequently constrained by limited human resources, low levels of legal literacy among the public, and resistance to systemic change. Research by Amrin indicates that community participation in PTSL programs in rural areas remains below 60 percent, primarily due to a lack of understanding of the legal benefits of land certification. This condition demonstrates that legal protection cannot rely solely on regulatory instruments; it must also be internalized through efforts to enhance public legal awareness (Oulousian et al., 2023).

A participatory approach, therefore, becomes a key element in strengthening legal protection within Integrated PTSL. Communities should not be positioned merely as objects of policy but must be recognized as legal subjects with an active role in the

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verification and determination of land boundaries. A study by Junarto confirms that community involvement in PTSL adjudication activities significantly improves the accuracy of physical and juridical data and reduces the potential for disputes by up to 35 percent. This finding reinforces the argument that effective legal protection emerges from collaboration between the state and society, rather than from procedural compliance alone.

The digital transformation of Integrated PTSL during the 2023–2025 period also introduces new challenges to legal protection. The utilization of GNSS technology and drone imagery has indeed enhanced efficiency and measurement coverage; however, it also raises concerns regarding data validity when not accompanied by adequate field verification. Fahmi observes that coordinate errors resulting from drone-based measurements without direct verification can reach 10–15 centimeters, a discrepancy that is legally significant and sufficient to trigger boundary disputes. Consequently, legal protection in the digital era must be capable of accommodating technological risks through regulatory arrangements that clearly stipulate verification obligations and legal responsibility.

The need for adaptive legal reconstruction becomes increasingly apparent in light of technological developments in land administration. Although Ministerial Regulation of ATR/BPN Number 16 of 2021 governs procedures for land measurement and boundary determination, it does not explicitly regulate the legal responsibility of non-owner boundary designators. This normative gap has the potential to weaken legal protection by allowing divergent interpretations in dispute resolution. From an administrative law perspective, such normative ambiguity contravenes the principle of legal certainty and may result in substantive injustice for the parties involved.

Legal protection within Integrated PTSL must also be understood within the broader framework of social justice as enshrined in Pancasila and the Basic Agrarian Law of 1960. The state bears a constitutional obligation to ensure that land policies do not

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merely serve administrative interests but also protect vulnerable communities from structural inequality. Studies by Earlene and Djaja demonstrate that agrarian reform policies lacking robust legal protection mechanisms tend to fail in reducing land tenure inequality. Accordingly, PTSL, as an instrument of agrarian reform, must be situated within a legal protection framework oriented toward substantive justice.

The effectiveness of legal protection is also highly dependent on institutional performance and coordination. The Ministry of ATR/BPN, regional governments, and village authorities play strategic roles in ensuring that measurement, verification, and certification processes adhere to the principle of legality. Supadno's research indicates that inter-institutional collaboration and community involvement in boundary marker installation can reduce the risk of parcel overlap by up to 40 percent. This finding underscores that legal protection is not an abstract concept, but rather the outcome of consistent and coordinated governance practices (Shearer et al., 2022).

The role of boundary designators as administrative witnesses within the PTSL system likewise demands particular attention within the legal protection framework. Although they directly contribute to the validity of measurement outcomes, boundary designators often lack adequate legal protection when disputes arise. In the absence of clear regulation governing their legal status, rights, and responsibilities, legal protection within PTSL risks becoming uneven and unjust. Strengthening regulations that explicitly define the legal position of boundary designators is therefore an integral component of efforts to reinforce legal protection in Integrated PTSL.

The principle of *contradictoire delimitation* remains a fundamental requirement for ensuring the legal validity of land parcel boundaries. Supriyanti emphasizes that this principle requires direct agreement among adjoining landowners as a condition of legal legitimacy in boundary determination. When this principle is disregarded, such as through technology-driven measurements conducted without adequate social interaction, the legal

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protection promised by PTSL loses its substantive meaning. Technology must therefore be positioned as a supportive tool, not as a substitute for foundational legal principles. Ultimately, legal protection in Integrated PTSL must be grounded in a balance between legal certainty, justice, and utility, as articulated by Gustav Radbruch. The state is required not only to deliver an efficient land registration system but also to ensure that every land policy and administrative practice provides tangible legal protection to society. Through an adaptive, participatory, and socially just legal framework, Integrated PTSL can function as a strategic instrument in building a fair and sustainable national land administration system.

Legal protection within the Integrated Complete Systematic Land Registration (PTSL) framework represents a concrete manifestation of the state's constitutional mandate to ensure legal certainty and justice in land tenure and ownership. The normative foundation of this system is rooted in Article 33 of the 1945 Constitution of the Republic of Indonesia, which affirms state control over land, water, and natural resources for the greatest benefit of the people, as well as Article 28D paragraph (1), which guarantees the right to fair legal certainty. These constitutional principles are further operationalized through Law Number 5 of 1960 on Basic Agrarian Principles (the Basic Agrarian Law), which serves as the cornerstone of Indonesia's national agrarian legal system oriented toward social justice and legal certainty.

The Basic Agrarian Law positions land registration as the primary legal instrument for realizing certainty of land rights. Article 19 explicitly mandates the state to conduct land registration throughout the territory of Indonesia in order to guarantee legal certainty. Within this framework, PTSL cannot be perceived merely as an administrative policy, but rather as a legal obligation of the state to establish a legitimate, orderly, and accountable system of land rights recognition. Pasamai and Salle argue that land registration constitutes a form of preventive legal protection, as it reduces the potential

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for disputes by providing state-recognized evidence of rights from the outset. Technical regulation of land registration is further elaborated in Government Regulation Number 24 of 1997 on Land Registration. This regulation emphasizes that land registration encompasses continuous activities of collecting and processing both physical and juridical data. One of its most critical aspects concerns the determination of land parcel boundaries through measurement and mapping. Each parcel must have clear, agreed-upon, and officially recorded boundaries to ensure that the issued land certificate possesses strong evidentiary value. This requirement aligns with the principle of *contradictoire delimitatie*, which demands the agreement of directly adjacent landholders as a condition for the legal legitimacy of boundary determination.

Within the context of Integrated PTSL, the provisions of Government Regulation Number 24 of 1997 are reinforced by Ministerial Regulation of the Ministry of Agrarian Affairs and Spatial Planning/National Land Agency (ATR/BPN) Number 6 of 2018 on the Acceleration of PTSL Implementation. This regulation introduces a systematic and large-scale approach to land registration aimed at expediting national certification targets. At the same time, it affirms the state's role in providing legal protection through structured procedures, including measurement, juridical data verification, public announcement of data, and certificate issuance. Consequently, PTSL functions as a form of structural legal protection designed to reach all segments of society, particularly groups that have historically been excluded from formal land administration systems.

The legal obligation of the National Land Agency (BPN) in implementing PTSL constitutes a central element of the land law protection framework. As the institution vested with authority over land administration, BPN bears responsibility for ensuring the accuracy and validity of both physical and juridical data underlying certificate issuance. Purnama and Khasanah emphasize that BPN's responsibility reflects the principle of public accountability, meaning that every administrative action must be legally justifiable

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to the public. Where measurement errors or data inaccuracies are identified, the state, through BPN, is obligated to provide corrective mechanisms, including remeasurement or annulment of legally defective certificates (Kusmiarto et al., 2021). In practice, however, the fulfillment of these obligations does not always proceed optimally. Empirical studies indicate a persistent gap between legal norms and their implementation. Andrian observes that in several regions, particularly rural areas, juridical data verification is often complicated by informal land transactions that are not officially recorded. This situation hampers BPN's ability to ascertain the legitimacy of rights holders and creates latent risks of future disputes. These findings demonstrate that legal protection under PTSL is highly dependent on the alignment between formal regulation and societal legal awareness.

A further significant issue concerns the legal position of non-owner boundary designators. In PTSL practice, boundary designation is frequently carried out not by landowners themselves, but by individuals deemed knowledgeable about land boundaries, such as village officials or community leaders. Sagala and Santiago note that the legal status of such boundary designators occupies a grey area: although they hold no land rights, they bear substantial administrative responsibility. When measurement errors or boundary disputes arise, these individuals may face legal claims without enjoying clear legal protection. The absence of explicit regulation governing the status, rights, and responsibilities of non-owner boundary designators creates an imbalance within the legal protection system. While land law predominantly safeguards landowners' rights, administrative actors involved in the registration process often receive insufficient legal protection. Taufiq and Agustina argue that this imbalance contradicts the principles of justice and legal certainty, as every party engaged by the state in administrative processes should receive protection proportional to the responsibilities imposed upon them (Wang et al., 2022).

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Beyond institutional issues, legal protection within Integrated PTSL is increasingly challenged by the digital transformation of land administration. The use of Global Navigation Satellite Systems (GNSS), aerial imagery, and geospatial information systems has significantly enhanced measurement efficiency and accuracy. Nevertheless, Hidayati and Roedianto caution that digitalization also introduces new risks, including data entry errors, information manipulation, and cybersecurity vulnerabilities. Accordingly, legal protection must extend beyond technical procedures to encompass the integrity of digital systems through layered audit and oversight mechanisms. Community participation remains a key determinant of effective legal protection in PTSL. Empirical evidence shows that areas actively involving communities in socialization and measurement processes experience higher success rates and lower dispute incidence. Villages that conduct boundary determination deliberations and publicly disclose measurement data have reportedly reduced conflict potential by up to 30 percent. This underscores that legal protection derives not only from regulation, but also from social legitimacy fostered through meaningful public participation (Putra et al., 2025).

Legal protection within Integrated PTSL must also incorporate effective repressive mechanisms. When disputes nonetheless arise, the legal system must provide fair and efficient avenues for resolution. Courts, agrarian mediation, and alternative dispute resolution mechanisms function as essential tools for restoring violated rights. As Pasamai and Salle assert, repressive legal protection complements preventive protection by ensuring that rights violations can be addressed through lawful processes. Ultimately, legal protection in Integrated PTSL should be understood as a holistic and sustainable system. The integration of clear legal norms, accountable institutions, reliable technology, and active public participation constitutes the cornerstone of land rights certainty. Through such an approach, PTSL transcends its role as a mere certification acceleration

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program and emerges as a strategic state instrument for realizing agrarian justice and equitable land governance.

Legal protection within the Integrated Complete Systematic Land Registration (PTSL) scheme must be assessed not only at the normative and procedural levels, but also through an examination of its legal consequences and the effectiveness of its implementation. In this regard, the legal consequences of PTSL encompass substantive implications for landowners and administrative actors alike, while simultaneously reflecting the extent to which the legal protection promised by regulatory frameworks is realized in practice. Consequently, integrating an analysis of legal effects with an evaluation of implementation is essential to obtain a comprehensive understanding of both the strengths and structural limitations of the Integrated PTSL system.

Substantively, the primary legal consequence of PTSL is the issuance of land rights certificates as strong evidentiary instruments, as mandated by Article 19 of the Basic Agrarian Law and Government Regulation Number 24 of 1997. Certificates produced through PTSL provide legal certainty concerning the subject, object, and type of land rights, thereby strengthening the legal position of landowners in both private and administrative legal relations. From a civil law perspective, clarity regarding boundaries and legal status significantly reduces the likelihood of disputes between adjacent landholders and facilitates legal transactions such as sale, inheritance, and grants. In this sense, PTSL functions as a preventive legal protection mechanism by addressing potential conflicts at an early stage.

Nevertheless, these legal consequences do not invariably produce positive outcomes when measurement and boundary determination processes fail to comply with principles of administrative prudence. Errors in boundary designation, particularly those involving non-owner boundary designators, may result in administrative defects in issued certificates. Under administrative law, procedural flaws arising during measurement or

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data verification may undermine the evidentiary value of a certificate and render it susceptible to annulment through administrative review or judicial proceedings. This condition demonstrates that the legal effects of PTSL are highly contingent upon the quality of implementation and adherence to the principle of legality (Taufiq & Agustina, 2022).

From the perspective of state administrative law, deficiencies in the execution of PTSL may generate legal responsibility for implementing authorities, especially the National Land Agency (BPN), as the competent state institution. Measurement inaccuracies, verification negligence, or reliance on erroneous data may constitute maladministration. In such cases, the state bears an obligation to undertake corrective actions, including remeasurement, data rectification, or cancellation of legally defective certificates. These corrective mechanisms serve as forms of repressive legal protection for individuals adversely affected by administrative errors. Legal consequences also extend to boundary designators, particularly non-owner boundary designators who are engaged in the PTSL process without clear legal safeguards. In practice, these individuals often occupy a vulnerable position when boundary disputes arise, as their administrative role may be construed as personal accountability. The absence of explicit legal norms delineating the scope and limits of their responsibility exposes them to disproportionate risks of civil litigation or criminal accusations. This reality underscores that the legal implications of PTSL affect not only landowners but also administrative actors who contribute substantively to the measurement process (Hidayati & Roedianto, 2023).

In addition to substantive and administrative consequences, criminal law implications may arise in the implementation of PTSL, particularly where intentional misconduct, data falsification, or abuse of authority is involved. Deliberate manipulation of boundary data or intentional measurement errors may constitute criminal offenses under the Penal Code or sector-specific administrative legislation. However, it is crucial

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to distinguish clearly between administrative negligence and criminal acts involving intent. Failure to maintain this distinction risks undermining principles of justice and legal certainty by subjecting administrative errors to excessive penal sanctions.

An evaluation of the implementation of legal protection within Integrated PTSL indicates that system effectiveness is significantly influenced by inter-institutional coordination and human resource capacity. PTSL implementation involves multiple actors, including BPN, local governments, village authorities, and community members as landowners and boundary witnesses. Institutional fragmentation and weak coordination frequently emerge as primary sources of implementation challenges, particularly in data validation and field coordination. Empirical assessments reveal that regions characterized by strong institutional synergy tend to experience lower post-certification dispute rates than those with fragmented coordination (Guo et al., 2017).

The digital transformation of Integrated PTSL during the 2023–2025 period has exerted a considerable impact on the effectiveness of legal protection. The utilization of drones, Global Navigation Satellite Systems (GNSS), and geospatial information systems has enhanced measurement efficiency and accuracy while accelerating certification processes. However, evaluation findings suggest that technological advancement alone does not eliminate dispute potential if it is not accompanied by field verification and meaningful community participation. Technically accurate digital data may lack legal legitimacy when boundary determinations are not grounded in mutual agreement among adjacent parties.

Another critical evaluative concern relates to data protection and cybersecurity within the digital land administration system. The increased reliance on electronic certificates and digital land databases necessitates robust cybersecurity frameworks and systematic audit mechanisms. Without adequate safeguards, land data becomes vulnerable to manipulation, potentially resulting in severe legal consequences for

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landowners. Accordingly, legal protection under PTSL must be expanded to encompass guarantees of data integrity, system reliability, and accountability in digital land governance.

Evaluative analysis further demonstrates a positive shift from manual to digital approaches in land registration, contributing to improved legal certainty. Historical comparisons indicate that manual systems often produced measurement inconsistencies and prolonged dispute resolution processes. By contrast, digital systems facilitate faster data clarification and enhance transparency. Nonetheless, this evaluation also affirms that the success of legal protection is not determined by technology alone, but by the integration of legal norms, institutional governance, and social participation (Guo et al., 2017).

From the standpoint of substantive justice, the evaluation of Integrated PTSL highlights the continued necessity of strengthening preventive legal protection. Public legal education, enhanced land literacy, and the professionalization of surveyors and boundary designators constitute essential prerequisites for minimizing errors at an early stage. Absent systematic preventive measures, legal protection tends to become reactive, functioning only after disputes have already materialized.

Overall, the combined analysis of legal consequences and implementation evaluation reveals that Integrated PTSL has made a substantial contribution to land rights certainty, yet remains affected by normative and practical challenges. The legal outcomes generated by PTSL are closely linked to implementation quality and the clarity of legal norms governing the roles of involved actors. Consequently, regulatory strengthening, particularly concerning legal protection for boundary designators alongside enhanced technology-based oversight and evaluation mechanisms, is imperative. Through such measures, Integrated PTSL can evolve into a land registration system that is not only administratively efficient, but also legally just and institutionally sustainable.

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#### **4. CONCLUSION**

This study concludes that the legality of boundary designation and boundary approval plays a pivotal role in determining the effectiveness of Integrated Complete Systematic Land Registration (PTSL) as a mechanism for ensuring legal certainty and legal protection of land rights in Indonesia. Although the normative framework established under Government Regulation Number 24 of 1997 places land rights holders or their authorized representatives at the center of boundary determination in accordance with the principle of *contradictoire delimitatie*, the implementation of Integrated PTSL reveals a regulatory inconsistency arising from the expansion of boundary designators to non-owner parties through technical guidelines without adequate clarification of legal authority, responsibility, and protection. This inconsistency weakens the principle of legality and exposes land certificates to administrative and judicial vulnerability, while simultaneously placing non-owner boundary designators in a legally precarious position. The findings further demonstrate that improvements in technical accuracy and digitalization cannot substitute for procedural legality and social legitimacy, as legally valid boundary determination requires both accurate spatial data and the informed consent of adjacent landholders. Consequently, the effectiveness of legal protection in Integrated PTSL depends on regulatory harmonization, strengthened preventive safeguards, institutional accountability, and meaningful community participation. Without such normative reinforcement, PTSL risks producing land certificates that are administratively efficient yet juridically fragile, whereas with coherent legal reform and participatory implementation, it has the potential to evolve into a sustainable land registration system that fulfills its constitutional mandate to provide legal certainty, justice, and agrarian governance grounded in the rule of law.

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