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RESEARCH ARTICLE

Section: *Digital Humanities***Reconstructing spatial planning law through legal discourse: Adaptive Agrarian spatial governance and socio-ecological heritage in Indonesia**Soediro¹, Ika Ariani Kartini¹, Prasetyo Budi Wicaksana¹ & Yusuf Saefudin¹¹Faculty of Law, Universitas Muhammadiyah Purwokerto, Banyumas, Central Java, Indonesia*Correspondence: soediro@ump.ac.id**ABSTRACT**

Agricultural land conversion in Indonesia is usually framed as a failure of regulatory coherence and enforcement. This explanation is incomplete because it overlooks how legal and policy language constructs farmland as developable space, investment territory, food-producing land, digital-spatial data, or socio-ecological heritage. This study examines the hierarchy among those competing meanings and reconstructs spatial planning law through the Adaptive Agrarian Spatial Governance Theory (AASGT). It employs critical legal discourse analysis within a qualitative socio-legal design, combining a discourse-historical reading of Indonesian spatial-planning, sustainable-farmland, food, environmental, investment, and geospatial instruments with verified official statistics, peer-reviewed empirical evidence, and contrastive references to Japan, South Korea, and the Netherlands. The analysis identifies five intersecting formations: developmentalism, food security, constitutional-ecological responsibility, technocratic spatialism, and agrarian-community knowledge. Developmentalist and technocratic discourses acquire the greatest decisional authority because they translate land into economically convertible and administratively measurable space. Food-security commitments, ecological rights, and local agrarian knowledge remain visible but are less capable of constraining permits and spatial exceptions. AASGT addresses this imbalance through constitutional-ecological stewardship, intergenerational food justice, socio-ecological heritage, adaptive legality, digital-spatial accountability, economic counterweights, and participatory multilevel governance. The study contributes to legal and environmental humanities by demonstrating that land conversion is sustained by regimes of meaning and authority as well as by regulatory weakness.

KEYWORDS: adaptive governance, climate resilience, legal discourse, socio-ecological heritage, spatial planning law

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1. Introduction

Agricultural land is often presented in law as a stable category: a bounded surface that can be zoned, registered, monitored, protected, or converted. In practice, however, the legal identity of farmland is unstable. The same rice field may be represented as a source of national food, a private asset, a strategic infrastructure corridor, an urban land reserve, a flood-regulation surface, a cultural landscape, or a geospatial polygon awaiting administrative synchronization. These representations are not merely descriptive. They distribute authority, determine which evidence counts, and shape whether conversion appears unlawful, exceptional, or developmentally necessary. Agricultural-land governance is therefore not only a problem of regulating physical space; it is also a struggle over the legal production of spatial meaning (Lefebvre, 1991; Scott, 1998; Hajer, 1995).

Indonesia offers a particularly consequential setting for this struggle. The country has enacted an extensive architecture of agrarian, spatial-planning, environmental, food, and sustainable-farmland laws. Law No. 26 of 2007 establishes an integrated spatial-planning system, while Law No. 41 of 2009 creates the framework for Sustainable Food Agricultural Land (Lahan Pertanian Pangan Berkelanjutan, LP2B). Environmental protection, food security, regional government, geospatial integration, and investment licensing are regulated through additional statutory regimes. The legal framework has become increasingly data-intensive through the One Map Policy, One Data Indonesia, detailed spatial plans, electronic conformity instruments, and the protected-rice-field (Lahan Sawah yang Dilindungi, LSD) system. Presidential Regulation No. 4 of 2026 further centralizes and refines the control of rice-field conversion through an integrated team, remote-sensing verification, high-resolution mapping, incentives, supervision, and periodic reporting (Government of Indonesia, 2007, 2009a, 2009b, 2012, 2016, 2019, 2021, 2023, 2026).

Legal density has not eliminated material pressure. Official land inventories indicate that the national standard area of paddy fields declined from 7,463,948 ha in 2019 to 7,384,341 ha in 2024, a difference of 79,607 ha or approximately 1.07% between the two inventories (Ministry of Agrarian Affairs and Spatial Planning/National Land Agency [ATR/BPN], 2019, 2024). These endpoint values should not be treated as a direct annual conversion series because changes in verification and classification may affect comparability. They nevertheless demonstrate that legal protection operates within a shrinking and continuously contested physical base. At the microeconomic level, Rondhi et al. (2018) found that in peri-urban Jember the annual economic value of housing land was Rp39,904/m², compared with Rp4,447/m² for agricultural use—an approximately 8.97-fold differential. In rural Jember, the relationship was reversed but narrow: agricultural use generated only about 19.5% more value than housing. This contrast shows why prohibition alone is structurally fragile. Law asks farmers and local governments to preserve a land use whose social benefits are broad and long-term, while the private economic return to conversion can be immediate and concentrated.

Most Indonesian legal studies explain this tension through regulatory overlap, weak enforcement, inconsistent regional implementation, insufficient incentives, and fragmented authority. Recent research on agrarian reform and land acquisition also shows that administrative formalization and the legal expansion of “public interest” can redistribute authority and development burdens rather than merely improve coordination (McCarthy et al., 2022; Meckelburg & Wardana, 2024). These explanations are necessary but not sufficient. They tend to assume that legal categories such as “strategic development,” “public interest,” “spatial conformity,” “food security,” and “environmental carrying capacity” possess stable meanings. Critical discourse scholarship suggests otherwise: policy language organizes problems, authorizes actors, privileges forms of knowledge, and makes certain interventions appear reasonable while rendering alternatives less visible (Fairclough, 1992, 2003; Foucault, 1980; Wodak & Meyer, 2016). Spatial plans and legal maps are therefore not neutral containers. They are institutional texts through which territory becomes legible and governable, often at the cost of simplifying lived relations to land (Peluso, 1995; Li, 2007). Comparable empirical evidence from Indonesian public administration reinforces this institutional point: a strong statutory foundation does not by itself secure consistent bureaucratic compliance, because organizational norms, institutional culture, and enforcement mechanisms shape implementation more strongly than individual demographic characteristics (Rumtini et al., 2026).

This article develops that insight in three ways. First, it treats agricultural land conversion as a discursive as well as regulatory problem. The question is not only whether protection rules are enforced, but how competing legal discourses construct the object to be protected. Second, it connects legal discourse with environmental

humanities by conceptualizing agricultural landscapes as socio-ecological heritage: living systems in which productive capacity, ecological function, community knowledge, identity, and intergenerational continuity are mutually constituted. This concept avoids reducing heritage to aesthetic preservation or treating all farmland as culturally equivalent. Third, it proposes the Adaptive Agrarian Spatial Governance Theory (AASGT) as a normative and operational framework for rebalancing the authority of development, food, ecological, digital, and community claims.

The study addresses three questions: (1) How do Indonesian spatial-planning laws and policy documents construct the meaning, function, and value of agricultural land? (2) How do developmentalist, food-security, constitutional-ecological, technocratic-spatial, and agrarian-community discourses compete, and which acquire institutional authority? (3) How can AASGT reconstruct spatial planning law to protect agricultural land as constitutional and socio-ecological heritage? The central argument is that the persistent conversion of agricultural land is sustained by a discursive hierarchy. Developmentalist and technocratic-spatial discourses possess stronger institutional translation mechanisms—permits, conformity decisions, project classifications, maps, and executive coordination—than the counter-discourses of food security, ecological rights, and agrarian knowledge. Effective reconstruction must therefore alter both rules and the evidentiary architecture through which land-use decisions are justified.

2. Literature Review and Theoretical Framework

2.1 From conversion control to discursive governance

Research on agricultural land conversion consistently identifies urbanization, infrastructure, industrial expansion, land-price differentials, and low agricultural returns as major drivers. Conversion is especially difficult to reverse because built development changes both the physical surface and the expectations embedded in land markets. Peri-urban agriculture is nevertheless valuable for food access, water regulation, open space, urban cooling, and livelihood diversification (Rondhi et al., 2018; Mulya et al., 2023; OECD, 2022). Scenario modelling in the Cisadane watershed further demonstrates that protecting paddy fields, conserving forests, and accommodating urban demand generate cross-sectoral trade-offs that cannot be resolved through single-purpose zoning (Ambarwulan et al., 2023). The conventional policy response combines zoning, conversion permits, replacement requirements, fiscal incentives, and enforcement. Such instruments are indispensable, but their effectiveness depends on whether public benefits can compete with the private and fiscal rewards associated with urban development.

A regulatory-fragmentation approach asks whether institutions coordinate, whether plans are synchronized, and whether sanctions are applied. A discursive-governance approach adds a prior question: how is agricultural land constituted as a legal object? The term “unused” or “underutilized” land, for example, can erase seasonal, ecological, customary, and social functions. The classification of a project as “strategic” can reorganize the hierarchy of legal objectives before any permit is formally assessed. Likewise, the phrase “spatial conformity” may suggest objective consistency even when the plan itself reflects earlier political choices. Discursive analysis does not deny material drivers; it explains how those drivers are translated into legitimate institutional action.

2.2 Law, discourse, and spatial power

Critical discourse analysis treats language as a social practice through which institutions reproduce or challenge relations of power (Fairclough, 1992, 2003). The discourse-historical approach adds attention to intertextuality, temporal change, and the movement of arguments across legal and policy domains (Wodak & Meyer, 2016). Qualitative legal analysis reinforces this position by treating formal legal texts as performative and reality-producing rather than as transparent repositories of rules (Mitchell, 2023). Foucault’s account of power/knowledge is useful because modern spatial governance depends on expert categories, inventories, maps, and administrative standards that define what can be seen and acted upon (Foucault, 1980). In planning scholarship, the argumentative turn similarly shows that policy choices are shaped through storylines, problem definitions, and institutionalized forms of reasoning (Fischer & Forester, 1993; Hajer, 1995). Recent spatial-planning research demonstrates how critical discourse analysis can expose whether ecological concepts are institutionally translated into operational rules or remain symbolic commitments (Mendes et al., 2024). Related Indonesian

discourse research likewise demonstrates that authority is not simply possessed as a formal attribute but produced through modality, evaluation, and directive language that legitimizes norms and positions particular actors as authoritative agents (Turahmat et al., 2026).

The legal significance of discourse lies in its connection to authority. Statutory verbs such as “shall,” “may,” “can be adjusted,” and “must obtain a recommendation” distribute discretion, while nominalizations such as “conversion,” “optimization,” and “development” can obscure responsible actors and displaced values. Maps and indicators may appear more neutral than narrative argument, yet their categories, scales, update cycles, and error-correction procedures determine whose claims become legally visible. Research on Javanese ritual language similarly shows that linguistic forms can activate, coordinate, and authorize distributed agency rather than merely describe belief (Suroso & Fauzan, 2025). Spatial evidence must therefore be salient, credible, and legitimate to decision-makers and affected communities (Cash et al., 2003; Healey, 1997). Peluso’s (1995) concept of counter-mapping is especially relevant: participation must include the capacity to challenge the spatial representations on which decisions are based.

2.3 Socio-ecological heritage, food justice, and adaptive governance

Socio-ecological heritage denotes an agricultural landscape whose ecological functions, productive capacity, community knowledge, cultural continuity, and intergenerational significance are mutually constituted. It is broader than monumental heritage but narrower than a claim that every agricultural parcel is heritage. Status must be demonstrated through sustained food production, hydrological or biodiversity functions, durable community institutions, accumulated local knowledge, and vulnerability to irreversible conversion. The Food and Agriculture Organization’s Globally Important Agricultural Heritage Systems and UNESCO’s recognition of Bali’s Subak landscape show how agricultural systems can be both productive infrastructures and living cultural institutions (Food and Agriculture Organization [FAO], 2023; UNESCO, 2012). Literary-anthropological research on Banyumasan folklore similarly demonstrates how oral narratives sustain cultural identity, ethical values, and collective memory (Rifai & Pamungkas, 2025).

Food justice adds a distributional and recognitional dimension. Protecting a national aggregate of hectares is insufficient if farmers lose livelihood security, if replacement land is ecologically inferior, or if future generations inherit reduced productive capacity. Research in Karawang shows that land conversion is embedded in water-energy-food feedbacks, so an intervention that improves one sector may displace risk into another (Purwanto et al., 2019, 2021). Intergenerational equity requires law to preserve options and ecological functions rather than merely compensate present owners (Brown Weiss, 1989). Environmental constitutionalism further treats ecological protection as a legal obligation linked to public welfare and rights, not as a discretionary policy preference (May & Daly, 2015; Schlosberg, 2007).

Adaptive governance responds to climate uncertainty, changing hydrology, demographic pressure, and new spatial evidence through learning, polycentric coordination, monitoring, and institutional flexibility (Adger et al., 2009; Folke et al., 2005; Chaffin et al., 2014). Because flexibility can facilitate deregulation, law must authorize learning while preserving accountability, rights, and reviewability (Cosens et al., 2017, 2021). In AASGT, adaptation means strengthening agricultural functions in response to evidence, not relaxing protection whenever investment demand changes; a non-regression rule is therefore essential.

2.4 Research gap and analytical propositions

Four gaps emerge. First, most studies locate failure in enforcement without examining how legal language normalizes conversion. Second, spatial planning, food security, climate adaptation, digital land administration, and heritage are often treated as separate domains. Third, digitalization is commonly celebrated as a technical solution without sufficient analysis of data provenance, map error, public access, and contestability. Fourth, policy recommendations usually remain incremental—harmonize regulations, strengthen sanctions, improve coordination—without articulating a theory that explains what agricultural land is, why it deserves heightened protection, and how competing claims should be adjudicated.

The analysis is guided by three propositions. P1: Developmentalist discourse becomes legally dominant when broad objectives such as growth and strategic infrastructure are linked to concrete implementation devices, while food-security and ecological commitments remain programmatic. P2: Technocratic spatialism can improve

detection and consistency but may reproduce exclusion if digital evidence is not transparent and contestable.

P3: Agricultural-land protection becomes more resilient when constitutional, ecological, economic, digital, and community dimensions are institutionalized as mutually reviewable components rather than isolated sectoral objectives.

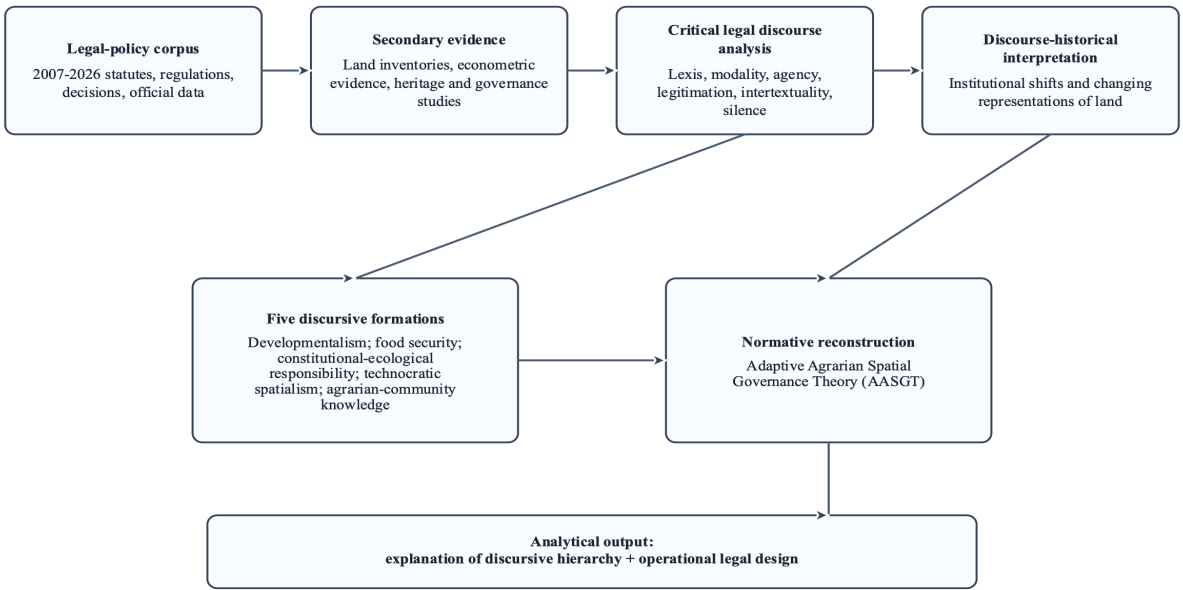


Figure 1. Research design and evidence chain

Figure 1 links the documentary corpus to the coding process and the normative reconstruction. The study does not present the secondary quantitative indicators as newly generated data; they function as an evidence audit for evaluating whether the identified discourse formations correspond to observable institutional and economic pressures.

3. Materials and Methods

3.1 Research design

This study employs critical legal discourse analysis within a qualitative socio-legal design. The approach combines doctrinal interpretation of legal authority with analysis of how legal and policy texts construct problems, actors, evidence, and legitimate solutions. It follows methodological guidance that legal texts should be examined for form, voice, rhetoric, performativity, and institutional effects (Mitchell, 2023), while the spatial-planning coding scheme draws on the integration of textual, discursive, and institutional analysis developed by Mendes et al. (2024). A discourse-historical reading was used to trace shifts from general spatial coordination (2007), to explicit agricultural-land and food protection (2009-2012), to geospatial integration and licensing reform (2016-2024), and finally to precision-oriented rice-field protection under Presidential Regulation No. 4 of 2026. The design is reconstructive rather than purely evaluative. Doctrinal analysis identifies the applicable rules, institutional competences, prohibitions, exceptions, incentives, and procedures. Discourse analysis examines the hierarchy of meanings through which those rules operate. Comparative materials are used for calibration—not for transplanting foreign institutions wholesale. Japan, South Korea, and the Netherlands were selected because they illustrate three complementary mechanisms: strict conversion control and farmland intermediation; economic preservation charges linked to conversion permission; and integrated, digitally accessible regulation of the physical environment.

3.2 Corpus construction and evidence validation

The primary corpus consists of constitutional provisions, national statutes, government and presidential regulations, ministerial regulations and decisions, and official land-inventory documents. Documents were

selected when they met at least one of six criteria: they defined agricultural land or protected spatial categories; regulated conversion or replacement; authorized strategic or public-interest development; established food or environmental obligations; governed geospatial evidence; or prescribed public participation and institutional coordination. The 2026 regulation was treated as the most recent executive instrument and read in relation to the 2019 framework it replaced.

Table 1. Legal-policy corpus and analytical function

Source family	Selected instruments/evidence	Period	Analytical function	Primary coding focus
Constitutional and agrarian foundations	1945 Constitution; Basic Agrarian Law No. 5/1960	1945-1960	State control and social function	Welfare; control; social obligation
Spatial-planning regime	Law No. 26/2007; Government Regulation No. 21/2021; Law No. 6/2023	2007-2023	Planning, conformity, licensing, sanctions	Modality; exceptions; central-local authority
Agricultural-land and food protection	Law No. 41/2009; Law No. 18/2012; LBS/LSD decisions	2009-2024	LP2B, replacement, incentives, food capacity	Protection; substitutability; implementation
Environmental and climate law	Law No. 32/2009; carrying-capacity and strategic assessment provisions	2009-present	Rights, prevention, carrying capacity	Proportionality; non-regression
Digital-spatial governance	Presidential Regulations No. 9/2016 and 39/2019; ATR/BPN Regulation No. 2/2024	2016-2024	One Map/Data and LSD verification	Authority; scale; transparency; contestability
Precision conversion control	Presidential Regulation No. 4/2026	2026	Integrated team, remote sensing, incentives	Technocracy; coordination; safeguards
Comparative calibration	Japan Cropland Act/Farm-land Banks; Korean Farm-land Act; Dutch Environment and Planning Act	Current	Control, economic correction, digital planning	Transferable design; contextual limits
Empirical and heritage evidence	LBS inventories; Rondhi et al. (2018); UNESCO; Lansing et al. (2017); recent studies	2017-2026	Pressure, attachment, adaptive heritage	Triangulation; deviant evidence

Note. *The corpus is purposive rather than exhaustive. Primary legal texts were prioritized; secondary evidence was used to test whether discursive patterns were materially plausible, not to claim a new national causal estimate.*

Table 1 shows that the corpus was structured to capture not only formal protection rules but also the institutional pathways through which developmental, food-security, ecological, digital, and community claims acquire different legal force. Secondary evidence was included only when its source and inferential status could be verified. Official 2019 and 2024 LBS inventories provide national endpoints. Rondhi et al. (2018) supply peer-reviewed microeconomic evidence and OLS estimates from Jember. UNESCO and peer-reviewed studies of Subak provide evidence that productive landscapes can operate as adaptive social-ecological institutions. Claims in the supplied working materials that lacked traceable sources, conflated national and local estimates, or assigned causal interpretations unsupported by the original study were excluded. This audit is important because a rigorous argument is weakened, rather than strengthened, by numerically precise but methodologically ambiguous claims.

Table 2. Evidence audit and validated quantitative baseline

Indicator	Verified value	Primary source	Inferential status	Analytical caveat
National LBS inventory	7,463,948 ha (2019)	ATR/BPN Decision No. 686/2019	Official inventory	Baseline, not annual conversion
National LBS inventory	7,384,341 ha (2024)	ATR/BPN Decision No. 446.1/2024	Official inventory	79,607 ha lower (-1.07%); classifications may differ
Peri-urban Jember value	Agriculture Rp4,447 vs housing Rp39,904/m ² /year	Rondhi et al. (2018)	Survey rent estimate	Housing $\approx 8.97\times$ agriculture; local evidence
Rural Jember value	Agriculture Rp6,047 vs housing Rp5,059/m ² /year	Rondhi et al. (2018)	Survey rent estimate	Agricultural premium $\approx 19.5\%$; narrow margin
Econometric fit	$R^2=.656$ (agriculture); $R^2=.640$ (housing); $p<.001$	Rondhi et al. (2018)	OLS estimates	Associations only; no national causality
LSD verification scale	1:5,000; 1:10,000 under technical constraints	Presidential Regulation No. 4/2026	Binding parameter	Precision requires metadata and challenge
Regional incentive threshold	$>87\%$ of LBS designated LSD/LP2B, plus conditions	Presidential Regulation No. 4/2026	Incentive criterion	Not a conversion quota
Replacement ratio	3 $\times$ irrigated; 2 $\times$ reclaimed swamp; 1 $\times$ non-irrigated	Law No. 41/2009, Art. 46	Statutory rule	Area does not ensure functional equivalence
Administrative timelines	21-day proposal; 30-day synchronization stages	Presidential Regulation No. 4/2026	Procedural limits	Faster process requires early participation

Note. *Calculations from the two LBS endpoints are descriptive. The article deliberately avoids converting them into a causal annual-loss rate.*

Taken together, Table 2 establishes the evidentiary boundary of the study: the official inventories document a nationally significant change in the protected land base, the Jember estimates demonstrate the intensity of local land-rent pressure, and the 2026 parameters show how protection is being operationalized through mapping precision, incentives, and procedural deadlines. The evidence therefore supports contextual and discursive interpretation without converting heterogeneous sources into an unsupported national causal model.

3.3 Coding and interpretation

The unit of analysis was the legally consequential statement rather than the entire document. Coding focused on: (a) lexical choice, including “protection,” “optimization,” “strategic,” “conformity,” and “empowerment”; (b) modality, especially mandatory, permissive, and discretionary formulations; (c) agency, or which institution is authorized to classify, map, recommend, approve, monitor, and object; (d) nominalization, where social conflict is reduced to an administrative event such as “change of use”; (e) legitimation, including appeals to growth, national interest, food security, efficiency, or scientific evidence; (f) intertextuality among planning, investment, food, and environmental regimes; and (g) silencing, particularly the limited legal visibility of farmer knowledge, livelihood continuity, and community-generated spatial evidence.

An initial deductive codebook drew on critical discourse analysis and the theoretical framework. Inductive reading then refined five formations: developmentalism, food security, constitutional-ecological responsibility, technocratic spatialism, and agrarian-community knowledge. Reliability was supported through a documented coding matrix, repeated reading of provisions in their wider statutory context, source triangulation, and explicit attention to negative evidence. For example, farmers who retained peri-urban land despite negative returns were treated as evidence against a purely economic explanation. The analysis therefore seeks analytic credibility rather than statistical representativeness.

3.4 Limitations of the design

The study is documentary and cannot establish how every local authority applies the law in practice. It does not generate a new remote-sensing series, national econometric model, or interview dataset. Comparative jurisdictions are used to identify design principles, not to rank legal systems. The concept of socio-ecological heritage also requires place-specific empirical validation before it can determine the status of a particular landscape. These boundaries are maintained to avoid overstating the evidence while preserving the article's theoretical contribution.

4. Results

4.1 A legal genealogy of agricultural-land representation

The genealogy reveals four overlapping phases. The first is constitutional-agrarian ordering, in which land is subject to state control for public welfare and carries a social function. The second is protective differentiation, marked by the Spatial Planning Law and the LP2B regime. Agricultural land becomes a category that can receive special designation, incentives, prohibition, and replacement obligations. The third is integration and acceleration. One Map, One Data, electronic planning, and the Job Creation framework increase central coordination and data consistency, but also connect spatial law more closely to streamlined licensing and investment administration. The fourth is precision protection, represented by Presidential Regulation No. 4 of 2026, which strengthens the map-based control of rice-field conversion through remote sensing, high-resolution verification, an integrated national team, incentives, supervision, and reporting.

These phases do not replace one another. They accumulate, producing a layered legal system in which public welfare, food protection, environmental rights, investment efficiency, and data precision coexist. The central problem is not the absence of protective vocabulary. It is the unequal institutional force attached to competing vocabularies. Developmental objectives are connected to project lists, permit pathways, land acquisition procedures, and executive coordination. Food and ecological objectives often require further regional designation, budgeting, monitoring, and enforcement before they can constrain a concrete project.

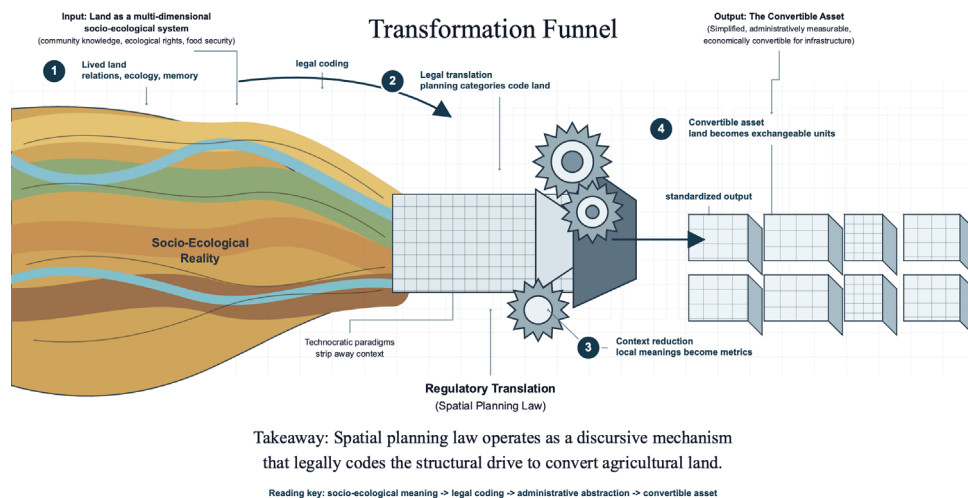


Figure 2. Spatial-planning law as a transformation funnel from socio-ecological reality to the legally convertible asset

Figure 2 synthesizes a core finding of the genealogy. Agricultural land enters the legal field as a thick socio-ecological reality—containing livelihoods, ecological services, and local institutions—but can leave it as a thin, measurable, and administratively convertible object. The image clarifies how regulatory translation itself becomes a discursive mechanism of conversion: what is omitted from the legal description often becomes easier to displace in practice.

Table 3. Legal genealogy and normative tensions

Phase	Key instruments	Dominant land representation	Principal mechanism	Unresolved tension
Constitutional-agrarian ordering	1945 Constitution; Law No. 5/1960	Socially obligated national resource	State control and public welfare	Broad mandate; limited climate/digital safeguards
Protective differentiation	Laws No. 26/2007, 41/2009, 32/2009, 18/2012	Planned territory, food base, environmental asset	Zoning, LP2B, prohibition, replacement, incentives	Depends on designation and regional implementation
Integration and acceleration	Presidential Regulations No. 9/2016, 39/2019; PP No. 21/2021; Law No. 6/2023	Interoperable data and development space	One Map/Data, digital conformity, licensing	Efficiency may outpace deliberation
Operational digital protection	ATR/BPN Regulation No. 2/2024	Verified protected polygon	Verification, updating, recommendations	Correction does not ensure contestability
Precision protection	Presidential Regulation No. 4/2026	Monitored strategic food infrastructure	Remote sensing, 1:5,000 mapping, coordination, incentives	Map-centric review may exclude functions and local knowledge

Table 3 shows that Indonesia's legal trajectory is cumulative rather than linear: each phase adds protective or informational capacity while leaving unresolved how competing public purposes are ranked in concrete decisions. This layered genealogy provides the basis for the following analysis of developmentalism, where strategic classifications, exceptions, and substitution mechanisms translate abstract priorities into actionable pathways for land-use conversion.

4.2 Developmentalism and the construction of convertible space

Developmentalist discourse does not usually deny the importance of agriculture. It establishes a hierarchy in which agriculture is protected unless a competing use is classified as more strategic, urgent, efficient, or publicly beneficial. The discursive mechanism is conditional recognition: food land is important, but conversion can be justified through exceptions, replacement, compensation, or plan adjustment. This structure turns an apparent prohibition into a managed pathway. The crucial legal work is performed by institutions that define strategic value, certify conformity, and approve exceptions.

The Jember evidence clarifies why this discourse is powerful. Where housing land generates nearly nine times the annual value of agricultural use, conversion can be narrated simultaneously as rational private choice, urban necessity, and local revenue opportunity. Yet Rondhi et al. (2018) also identify farmers who continued farming despite negative returns. Their behavior reveals that land is not reducible to rent. Identity, livelihood continuity, family strategy, attachment, and expectations about the future shape decisions. Developmentalist discourse becomes hegemonic when these non-market values lack equivalent legal metrics and implementation devices. Replacement-land rules illustrate the same tension. The 3:2:1 ratios in Law No. 41 of 2009 acknowledge that conversion creates a public loss requiring substitution. However, area multiplication alone can mask differences in soil fertility, irrigation reliability, market access, farmer displacement, carbon and hydrological functions, and cultural continuity. A legal discourse of numerical equivalence may therefore authorize conversion while underestimating functional loss. AASGT responds by requiring function-equivalent rather than merely area-equivalent replacement.

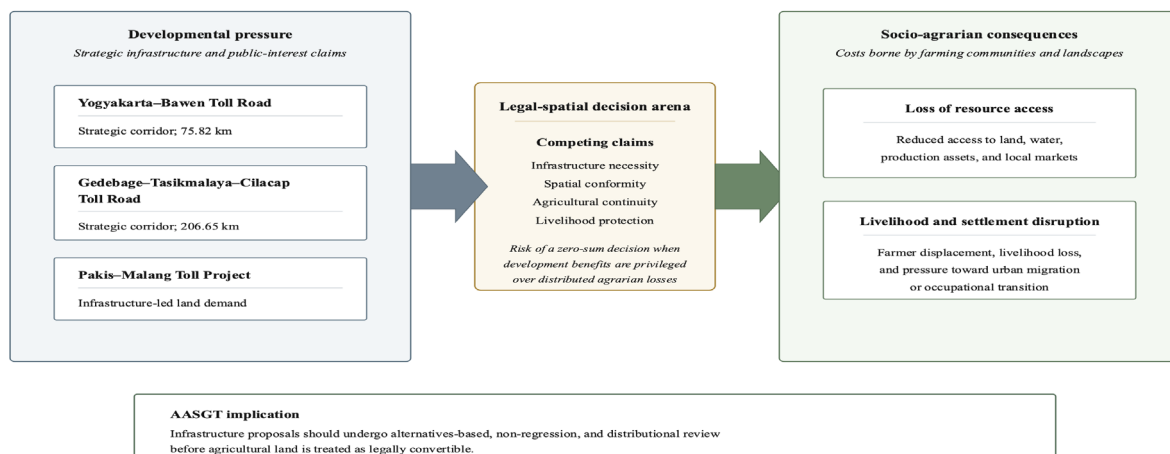


Figure 3. Infrastructure-led development and the zero-sum geography of agrarian conversion

Figure 3 illustrates the developmentalist rationality identified in the corpus. Strategic corridors and public-interest projects are narrated as engines of connectivity and growth, yet the same legal framing can obscure distributive losses borne by smallholders and peri-urban farming communities. The point is not that infrastructure is inherently anti-agrarian, but that the burden of justification becomes asymmetrical when development is treated as presumptively beneficial and agricultural continuity as negotiable.

4.3 Food security as an affirmed but subordinated discourse

Food security is highly visible across the legal corpus. LP2B protection, national food objectives, LSD mapping, farmer incentives, and the 2026 integrated-team framework all invoke the continuity of rice production. The language is often mandatory at the level of governmental responsibility. Nevertheless, food security is frequently operationalized through aggregate acreage, production targets, or designated polygons. This makes it vulnerable to two forms of subordination.

First, spatial substitution allows a productive landscape near consumers, irrigation networks, labor, and markets to be replaced by land elsewhere. National acreage may be maintained while regional accessibility, livelihood systems, and ecosystem services decline. Second, food security may be interpreted as an output objective rather than a land-governance principle. Intensification, imports, technological substitution, or new-field programs can then be used to argue that a particular conversion will not threaten national supply. Such reasoning disconnects food security from distributive justice and ecological resilience.

The evidence supports a more demanding interpretation. The decline between the 2019 and 2024 LBS inventories is modest in percentage terms but significant because paddy land is spatially concentrated and not perfectly replaceable. AASGT therefore treats food security as intergenerational food capacity: the legally protected ability of landscapes, infrastructures, institutions, and farming communities to produce food under future climatic and economic conditions. This shifts review from “Will national output immediately fall?” to “Does the decision irreversibly reduce socially distributed productive capacity and adaptation options?”

4.4 Constitutional-ecological responsibility as counter-discourse

The constitutional-ecological formation connects state control, public welfare, environmental rights, prevention, carrying capacity, and intergenerational responsibility. Its normative strength is substantial. It can challenge the assumption that compensation exhausts the public consequences of conversion. It also provides a basis for proportionality review: the greater the ecological and food-system irreversibility, the stronger the justification and safeguards required.

Its institutional weakness lies in translation. Environmental assessment can become a procedural attachment rather than a decision rule. Carrying-capacity language may be invoked without specifying thresholds. Intergenerational interests have no direct administrative representative. Where economic benefits are monetized and ecological losses remain qualitative, proportionality is structurally skewed. AASGT therefore

converts constitutional-ecological responsibility into measurable review obligations: cumulative-loss assessment, hydrological and soil-function indicators, climate-risk scenarios, non-regression tests, and written reasons explaining why alternatives with lower irreversible loss were rejected.

4.5 Technocratic spatialism and the authority of digital evidence

Presidential Regulation No. 4 of 2026 represents a significant strengthening of digital-spatial governance. Remote-sensing verification, a preferred 1:5,000 scale, coordinated data flows, fixed procedural stages, central recommendations, incentives, supervision, and reporting can reduce ambiguity and opportunistic local reclassification. The regulation responds to a genuine problem: protection cannot be enforced when the location, legal status, and physical condition of rice fields are inconsistent across datasets.

The discourse of precision nevertheless creates a new form of authority. Once a polygon is represented as official, the map may displace debate about the quality, seasonality, customary use, or social dependence associated with the land. Scale does not eliminate error; it changes the kinds of error that matter. A technically precise boundary can still be normatively incomplete. The key questions are therefore who supplies the data, how changes are logged, whether model or image uncertainty is disclosed, how landholders and communities correct errors, and whether decision-makers must explain departures from both official and community evidence.

Digital-spatial accountability requires more than digitization. It requires provenance, interoperability, public accessibility, version control, reasoned decisions, independent audit, and a right to contest. Indonesian studies show that participatory land administration can improve completeness and contextual usability, while digital transformation remains constrained by data quality, interoperability, cyber-security, institutional capacity, and regulatory readiness (Aditya et al., 2020; Kusmiarto et al., 2021). Field-data systems aligned with the Land Administration Domain Model also illustrate how spatial, legal, and personal data can be collected and validated together, but standardization does not itself resolve questions of access or authority (Aditya et al., 2021). The Netherlands' digital environment-and-planning system demonstrates the value of integrating location-specific rules, permit checks, and applications in a unified portal. Yet its lesson for Indonesia is not simply platform integration. The legal value lies in making the rule-data-decision chain visible and reviewable. AASGT therefore treats participatory mapping and counter-evidence as components of due process.

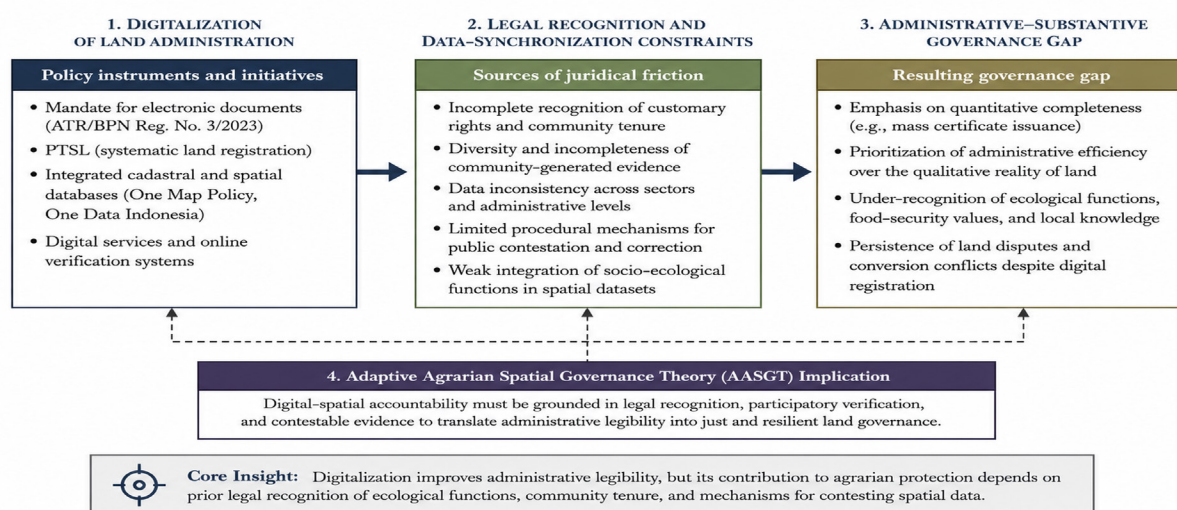


Figure 4. Digitalization and the administrative-substantive gap in agrarian spatial governance.
Source: Authors' conceptualization.

Figure 4. Digital transformation, juridical friction, and the administrative gap

Figure 4 condenses the ambivalence of technocratic spatialism. Digitization and electronic documentation can improve legibility, traceability, and coordination, but they do not automatically resolve questions of legal recognition, community rights, or the substantive quality of protected land. When mapping capacity advances faster than legal safeguards and participatory verification, a new administrative gap emerges between precise records and just outcomes.

4.6 Agrarian-community knowledge and discursive silence

Agrarian-community knowledge is the least institutionalized of the five formations. Farmers and local institutions appear mainly as beneficiaries, data providers, or consultees, while their knowledge rarely receives defined evidentiary status in conversion review. The law may invite participation yet retain a technical hierarchy in which state-certified maps and expert assessments remain decisional. Participation improves environmental performance only when it shapes information, learning, preferences, compliance, and institutional choice rather than functioning as ritual consultation (Newig et al., 2018; Widiatedja & Ranawijaya, 2023). Evidence from rural Bali further shows that formal inclusion can coexist with geographic exclusion, while grassroots actors operate as epistemic connectors whose lived experience is indispensable to place-sensitive and socially negotiated governance (Hendrawati et al., 2025).

Subak demonstrates why that hierarchy is incomplete. UNESCO describes a cooperative system of canals, weirs, temples, and collective water governance that has shaped Bali's agricultural landscape for centuries. Network research identifies adaptive self-organization rather than static folklore (Lansing et al., 2017), while recent work emphasizes the integration of ecological knowledge, institutions, and infrastructure (Zen et al., 2024). Papuan oral traditions provide a parallel case: myths and ritual speech can operate as ecological jurisprudence and Indigenous governance through place-based prohibition, ancestral legitimation, ritual repair, and mediated modernity (Fatary et al., 2025). The legal implication is not that tradition overrides science, but that community institutions can generate technically relevant evidence and coordinate resources at scales formal administration may not capture.

The same principle applies to Pranata Mangsa. Climate change may reduce the reliability of historical seasonal cues without making local knowledge irrelevant. Cultural calendars should be recalibrated with meteorological data, crop models, and farmer observation rather than romanticized or discarded. Adaptive heritage is living knowledge capable of revision, particularly where land-use change reshapes local resilience (Widianingsih et al., 2024). AASGT gives such knowledge legal standing through participatory mapping, community-evidence protocols, and reasoned-response duties.

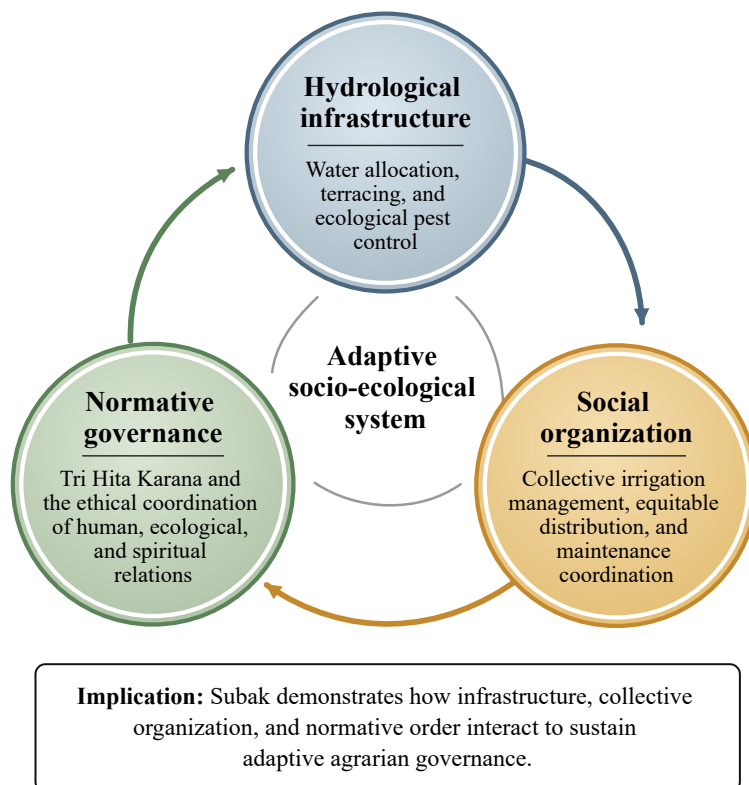


Figure 5. Subak as a socio-ecological governance model for adaptive spatial planning

Figure 5 supports the argument that socio-ecological heritage should be treated as operational governance knowledge, not as residual culture. Subak integrates hydrological engineering, social organization, and normative discipline through the Tri Hita Karana philosophy. This combination shows why locally embedded institutions can stabilize water distribution, maintenance, and ecological compliance in ways that are directly relevant to adaptive spatial planning.

Pranata Mangsa as an adaptive knowledge system for climate-responsive agrarian planning

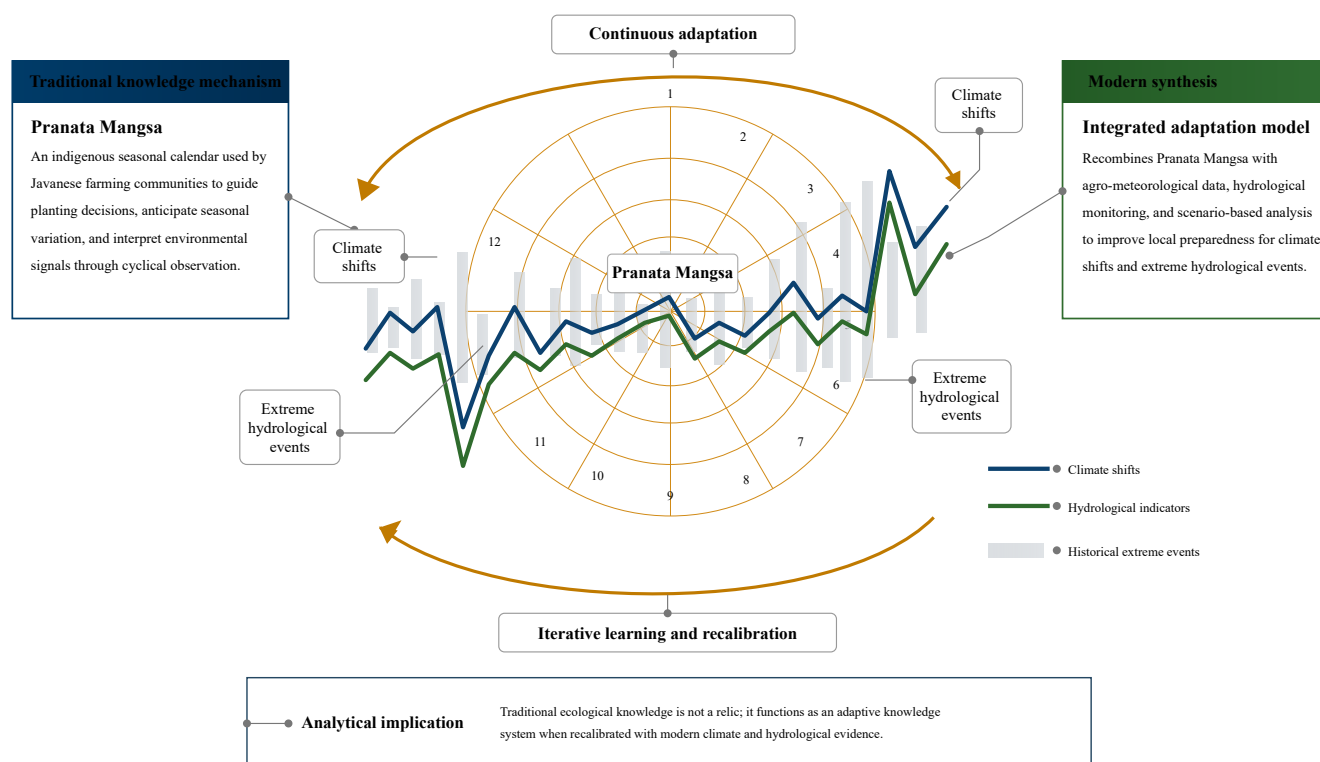


Figure 6. Adaptive synthesis of Pranata Mangsa and modern agro-meteorological evidence

Figure 6 reinterprets Pranata Mangsa as adaptive rather than merely traditional knowledge. The article's position is not to romanticize inherited calendrical systems, but to treat them as locally situated forecasting logics that gain renewed value when recalibrated with contemporary meteorological data. This is precisely the form of knowledge integration AASGT requires: not replacement of local knowledge by science, but disciplined recombination.

4.7 The integrated discursive hierarchy

Table 4. Evidence matrix of competing discursive formations

Formation	Typical vocabulary	Land representation	Authorized actors	Weakly represented interests	Material-legal effects	Limiting evidence
Developmentalism	Strategic; acceleration; optimization; public interest	Convertible economic space	Executive, licensing/project authorities, investors	Attachment; cumulative loss; future food capacity	Permits, plan adjustment, acquisition	Farmers retain low-return land
Food security	Protection; availability; sovereignty; production	Productive national resource	Agricultural and designated-land authorities	Distribution, access, livelihoods, ecosystems	LP2B/LSD, incentives, replacement	National output may mask local decline
Constitutional-ecological	Welfare; rights; carrying capacity; sustainability	Public and intergenerational asset	Courts, environmental bodies, citizens, state	Thresholds and future representation	Assessment, prevention, proportionality	Strong norms may become procedure

Formation	Typical vocabulary	Land representation	Authorized actors	Weakly represented interests	Material-legal effects	Limiting evidence
Technocratic spatialism	Verification; scale; conformity; integration	Measurable polygon	ATR/BPN, geospatial and planning bodies	Uncertainty, provenance, customary use, counter-evidence	Remote sensing, maps, monitoring	Precision may remain normatively incomplete
Agrarian-community knowledge	Livelihood; memory; seasonal knowledge; collective water	Living socio-ecological landscape	Farmers, Subak, community institutions	Formal evidence and decisional authority	Participation and counter-mapping	Local knowledge requires calibration

Note. *The matrix identifies ideal-typical formations. Individual provisions may combine several discourses, and no formation is internally uniform.*

Table 4 confirms that the five formations are not equally consequential. Developmentalism and technocratic spatialism possess the strongest translation into permits, maps, and executive procedures, whereas ecological and community claims require additional institutional interpretation before they can alter an outcome. Figure 7 therefore visualizes a hierarchy of decisional force rather than a simple count of how frequently each discourse appears.

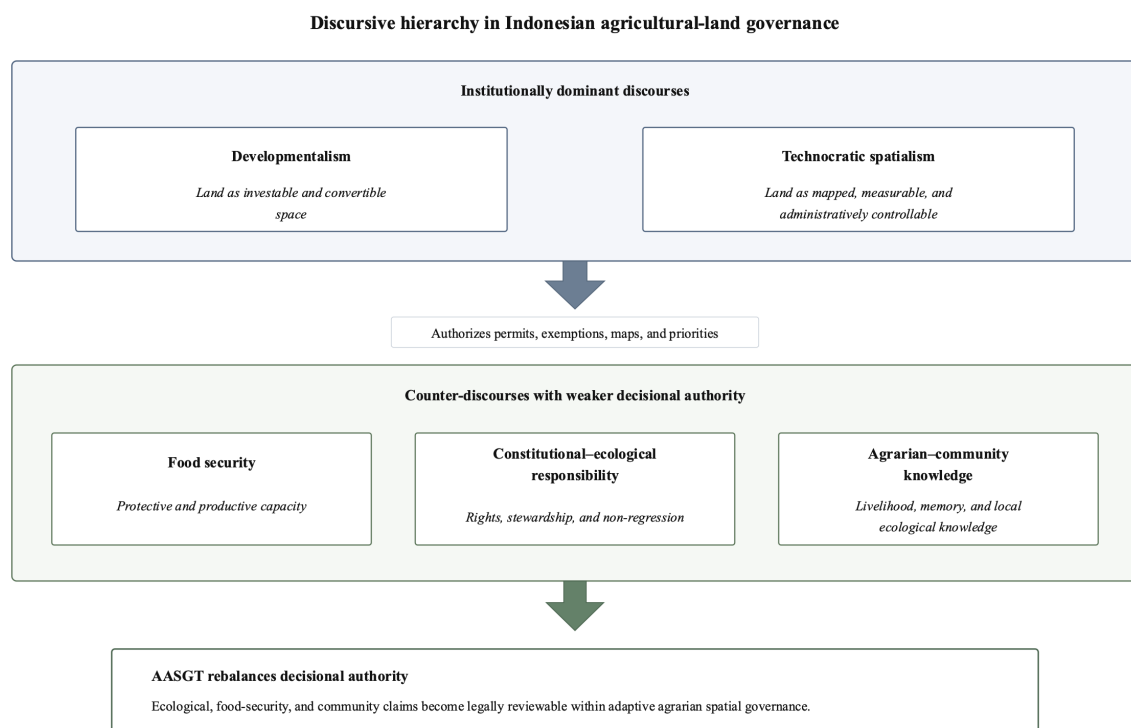


Figure 7. Discursive hierarchy in Indonesian agricultural-land governance

The hierarchy concerns decisional translation rather than rhetorical frequency. Food and ecological language may appear frequently while possessing fewer instruments capable of stopping or redesigning a particular conversion.

5. Discussion

The findings deepen the conventional diagnosis of regulatory fragmentation by showing that the problem arises not only from overlapping mandates but also from an unequal hierarchy of institutional rationalities. Planning authorities construct agricultural land through zoning and territorial conformity; investment institutions prioritize speed and certainty; agricultural agencies emphasize productive acreage; environmental institutions

focus on impacts and carrying capacity; and communities understand land through livelihood, memory, water, identity, and place. These representations carry unequal legal weight. Developmental and technocratic discourses are more readily translated into permits, project classifications, cadastral boundaries, and budgetary instruments, whereas ecological, food-system, and community values often remain aspirational. Law therefore does not merely regulate space; it produces governable spatial objects through language, classification, and institutional knowledge (Fairclough, 1992, 2003; Foucault, 1980; Hajer, 1995; Lefebvre, 1991). A discourse-sensitive reconstruction must identify which representation governs a decision, which actors it authorizes, what evidence becomes legally visible, and which values become enforceable. This perspective explains how a project may satisfy spatial plans, replacement ratios, and environmental procedures while still weakening hydrological resilience, food access, farmer continuity, and socio-ecological heritage. The central issue is therefore not development versus conservation, but an asymmetrical decision system that specifies development benefits in detail while reducing agricultural losses to hectare counts. AASGT consequently requires a commensurate assessment of lost food capacity, water regulation, carbon functions, livelihoods, adaptation options, and cultural continuity.

The comparative analysis in Table 5 demonstrates that durable farmland protection rarely depends on prohibition alone. Japan combines conversion control and agricultural-promotion areas with institutions facilitating land consolidation, transfer, and entry by active farmers, thereby linking preservation with productive use (OECD, 2025). South Korea supplements conversion permission with farmland-preservation charges and a dedicated management fund, requiring development to internalize part of the public cost imposed on agricultural land (Republic of Korea, 2024). The Netherlands, meanwhile, integrates spatial, environmental, infrastructural, and participatory rules within a unified statutory and digital system through which users can identify location-specific requirements, assess permit obligations, submit applications, and review participation information (Netherlands, 2021). These cases confirm that effective governance requires the interaction of regulatory restriction, economic correction, reliable information, institutional mediation, and procedural accountability (OECD, 2022). Indonesia already possesses LP2B and LSD designations, replacement requirements, detailed plans, One Map and One Data systems, incentives, remote-sensing verification, and digital platforms, but it lacks a unified legal test connecting these instruments to the public functions of particular landscapes. Without such a test, preservation charges may become prices for conversion, authoritative maps may centralize errors without providing a right to challenge them, and participation may become symbolic in the absence of response duties. Table 5 therefore supports the adoption of transferable principles—conversion restraint, land-use intermediation, economic counterweights, integrated information, meaningful participation, and adaptive review—while demonstrating the need to adapt them to Indonesia’s decentralized, agrarian, and constitutional setting.

AASGT is formulated as a mid-range legal-governance theory explaining how agricultural-land protection can remain effective under changing climatic, economic, institutional, and informational conditions. It rests on three normative foundations. First, constitutional-ecological stewardship recognizes that strategically important agricultural landscapes perform public functions beyond private ownership and commodity production, linking their protection to public welfare, ecological integrity, environmental rights, and state responsibility (May & Daly, 2015). Second, intergenerational food justice requires present decisions to preserve future productive capacity, equitable food access, farmer livelihoods, and adaptation options rather than merely maximizing current output (Brown Weiss, 1989; Gottlieb & Joshi, 2010; Schlosberg, 2007). Third, socio-ecological heritage denotes the living relationship among land, water systems, productive practices, local knowledge, collective institutions, and cultural continuity. This position is consistent with scholarship showing that resilience emerges from interactions among ecological resources, institutions, knowledge, and user communities rather than from biophysical assets alone (Berkes & Folke, 1998; Ostrom, 2009). Enhanced protection is therefore warranted where these functions converge, particularly in landscapes containing collective irrigation systems, long-standing institutions, distinctive hydrological functions, or embedded adaptation practices. This does not render all farmland immutable. Figures 5 and 6 instead demonstrate how landscape-level review can incorporate living institutions and revisable traditional ecological knowledge without treating either as fixed or inherently authoritative.

Table 6 translates these normative foundations into operational legal mechanisms by combining adaptive

legality with non-regression, thereby permitting planning revisions based on improved scientific, climatic, and spatial evidence without allowing adaptation to become a vehicle for deregulation. This approach reflects adaptive-governance scholarship emphasizing institutional learning, polycentric coordination, feedback, and iterative adjustment while retaining safeguards against opportunistic flexibility (Folke et al., 2005; Chaffin et al., 2014; Cosens et al., 2017). Climate-responsive review requires assessment of water availability, flood and drought exposure, soil conditions, heat, crop suitability, and future productive scenarios. Digital-spatial accountability requires data provenance, interoperability, public metadata, version histories, correction procedures, independent audits, and rights to submit counter-evidence. Indonesian experience shows that digital systems can improve coverage and precision, but technical standardization alone cannot resolve conflicts over authority, community tenure, or the meaning of land (Aditya et al., 2020, 2021; Kusmiarto et al., 2021). Economic counterweights—including incentives, preservation charges, tax differentiation, livelihood safeguards, and function-equivalent replacement—should correct rather than legitimize conversion pressure. Participatory multilevel governance must likewise recognize communities as producers of evidence and require reasoned institutional responses, because participation improves outcomes only when it influences knowledge, learning, compliance, and institutional choice (Newig et al., 2018). Together, these mechanisms replace the narrow question of formal permission with seven cumulative tests: legal conformity, demonstrated necessity, the absence of lower-loss alternatives, non-regression, protection of future food capacity, ecological and heritage proportionality, and accountable participation. Where a landscape performs an irreplaceable hydrological, productive, or heritage function, failure to satisfy these tests may justify refusal despite the availability of monetary compensation.

The resulting framework integrates legal humanities, environmental humanities, adaptive governance, and digital land administration. For legal humanities, AASGT shows that agricultural land is constructed through categories, maps, modalities, evidentiary hierarchies, and institutional narratives. Conversion becomes possible when land is represented as developable, measurable, or strategically necessary space rather than as an ecological, productive, cultural, and intergenerational system (Scott, 1998; Fairclough, 2003). For environmental humanities, socio-ecological heritage reconnects legal abstraction with lived landscapes without treating culture as static, as illustrated by Subak's integration of hydrological infrastructure, collective organization, and normative systems into adaptive socio-ecological governance (Lansing et al., 2017; Zen et al., 2024). For adaptive-governance theory, AASGT adds legal safeguards to ensure that learning and flexibility strengthen rather than dilute protection, addressing concerns that resilience discourse can obscure questions of power and distribution (Cote & Nightingale, 2012; Davoudi, 2012). For digital governance, it establishes that map accuracy is necessary but insufficient unless spatial authority remains transparent, reviewable, and contestable. The theory nevertheless does not prohibit all conversion, presume that community knowledge is invariably accurate, or reject central coordination. It applies most strongly where public, ecological, food-system, and community functions are demonstrable and where the consequences of conversion are significantly distributive or irreversible. Its practical validity should therefore be tested through regional studies combining legal files, longitudinal remote sensing, hydrological and soil indicators, land-value evidence, community accounts, and decision-process tracing.

6. Conclusion

Indonesia's agricultural-land problem cannot be explained solely by the absence of legal rules. The national legal framework already contains constitutional mandates, spatial-planning controls, LP2B protection, replacement-land requirements, environmental obligations, digital verification, fiscal incentives, and the 2026 framework for controlling rice-field conversion. The persistent vulnerability of agricultural land instead reflects how these instruments distribute authority among competing legal discourses. Developmentalism represents land as economically convertible space, while technocratic spatialism renders it administratively legible through maps, scales, and databases. Food-security discourse recognizes productive capacity but frequently operates at an aggregate level, constitutional-ecological responsibility frames land as a public and intergenerational asset, and agrarian-community knowledge understands it as a living landscape shaped by livelihood, water, identity, and collective memory. The central legal task is therefore not to eliminate one discourse, but to prevent those supported by the strongest administrative machinery from monopolizing spatial decisions. AASGT responds to this imbalance by combining constitutional-ecological stewardship, intergenerational food justice, and

socio-ecological heritage with adaptive legality and non-regression, climate-responsive review, digital-spatial accountability, economic counterweights, and participatory multilevel governance. In this way, the theory translates broad normative commitments into review triggers, legal mechanisms, institutional responsibilities, accountability metrics, and safeguards against regulatory dilution.

The proposed reconstruction has four immediate implications. First, decisions affecting strategic agricultural land should be subjected to a cumulative, alternatives-based, and non-regression test rather than assessed only for formal conformity with spatial plans. Second, replacement land should be functionally equivalent, ecologically viable, and operational before conversion occurs, rather than merely equal in area. Third, the LSD digital system should provide public metadata, version histories, correction procedures, transparent reasons for boundary changes, and formal channels for community counter-mapping. Fourth, farmers and affected communities should receive recognized evidentiary standing through early participation and mandatory written responses from decision-makers. These reforms would not prevent development, but would require it to internalize the constitutional, ecological, food-system, livelihood, and heritage values it displaces. Future research should test AASGT in high-pressure peri-urban corridors and socio-ecological heritage landscapes through mixed-method designs combining time-series satellite imagery, legal decision files, land-value and livelihood data, and interviews with farmers, planners, and affected communities. Such empirical testing is necessary to determine the workable thresholds of the framework, evaluate its effects on actual conversion decisions, and assess its transferability across Indonesia's diverse agrarian regions.

Declarations

Ethics approval: This documentary study did not involve human participants, personal data, or interventions; institutional ethics approval was therefore not required.

Data availability: The legal instruments and official datasets examined in this article are publicly available through the relevant government repositories. The evidence audit and analytical matrices are reported in Tables 1-6.

Use of generative AI: AI-assisted tools were used for structural and language refinement. The authors remain responsible for source verification, legal interpretation, analysis, and all conclusions.

Conflict of interest: The authors declare no conflict of interest.

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