The Proposed Institutional Framework for Integrating Land Administration and Spatial Planning in Indonesia

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ABSTRACT

Indonesia's land and spatial governance systems currently operate as disconnected institutional silos, despite sharing fundamental objectives of regulating land use, ensuring tenure security, and achieving sustainable territorial development. The Ministry of Agrarian Affairs and Spatial Planning/National Land Agency (ATR/BPN) manages cadastral administration under the Basic Agrarian Law (UUPA) of 1960, while spatial planning functions fall under Law No. 26 of 2007, implemented through the National Development Planning Agency (Bappenas) and the National Geospatial Agency (BIG). These parallel systems maintain distinct legal frameworks, administrative hierarchies, operational protocols, and digital infrastructures, creating systematic inefficiencies in land governance, prolonged investment approval processes, and incoherent spatial policy outcomes.

This policy paper presents a comprehensive Institutional Integration Framework designed to unify land administration and spatial planning through coordinated governance mechanisms, interoperable data infrastructure, and harmonized legal provisions. The framework proposes the establishment of a National Land and Spatial Integration Council as a permanent inter-ministerial platform, adoption of the Land Administration Domain Model (ISO 19152) as a common data standard, and systematic legal harmonization to embed integration as a statutory obligation. Implementation of this framework promises substantial gains in administrative efficiency, improved legal certainty for investors and citizens, accelerated spatial plan enforcement, reduced bureaucratic duplication, and enhanced environmental sustainability. This paper advances both conceptual understanding of institutional integration **(Paasch & Rajabifard, 2021)** and practical policy pathways for Indonesian national and subnational governments.

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1. Introduction and Research Context

1.1 Background and Problem Statement

Indonesia's approach to land and spatial governance reflects a complex historical development characterized by legal stratification, institutional autonomy, and technological fragmentation **(Enemark, 2014).** The foundation rests on the Basic Agrarian Law of 1960 (UUPA), which established a State-based land rights system emphasizing tenure security, cadastral registration, and agrarian reform. This framework positioned the Ministry of Agrarian Affairs (later incorporated into ATR/BPN) as the custodian of national land information and the administrator of State land allocation processes. However, as Indonesia undergone rapid urbanization and experienced the need for more systematic spatial planning mechanisms in the late 20th century, a parallel governance system emerged through Law No. 26 of 2007 on Spatial Planning, which established comprehensive frameworks for regional spatial planning (RTRW), detailed spatial planning (RDTR), and inter-jurisdictional spatial coordination.

Rather than integrate with existing cadastral systems, this spatial planning regime created an autonomous institutional apparatus within Bappenas and regional planning agencies, operating under distinct mandates, administrative cultures, and technical standards. The National Geospatial Agency (BIG), established in 2011, added a third institutional actor with responsibility for maintaining the national geospatial information infrastructure, creating an additional layer of institutional complexity. Today, these three institutional nodes ATR/BPN (land administration and spatial planning), Bappenas and local governments (spatial planning), and BIG (geospatial infrastructure) function with minimal formal coordination mechanisms, producing several critical governance pathologies (Figure 1).

First, **regulatory fragmentation** generates conflicting policy directives. When land-use conversion is required for development, investors must navigate divergent regulatory pathways, obtaining ATR/BPN approval for agrarian conversion and land rights verification, securing Bappenas-coordinated spatial planning compliance, and satisfying sectoral requirements from forestry, environmental, or agricultural ministries. These processes operate on different timelines, employ different spatial data sources, and apply inconsistent definitions of land-use categories. The absence of integrated decision-making authority means that approval from one agency does not guarantee coherence with decisions made by others.

Second, **technical fragmentation** produces information asymmetries and inefficiencies. Cadastral databases maintained by ATR/BPN, spatial plans archived in planning offices, and geospatial basemaps held by BIG operate on different coordinate systems, use incompatible data formats, and employ inconsistent metadata standards. Regional governments

often lack access to complete cadastral information when developing spatial plans, leading to zoning decisions that disregard existing land rights. Conversely, land administration officers operate without knowledge of authorized land uses defined in spatial plans, creating situations were registered tenure rights conflict with zoning designations. The duplication of mapping efforts, inconsistent updating procedures, and lack of shared digital platforms magnify administrative costs and reduce decision-making quality.

Third, **organizational fragmentation** prevents institutional learning and adaptive coordination. Without formal mechanisms for inter-agency dialogue, information exchange, and joint problem-solving, each institution continues to optimize its own operations rather than contribute to system-wide coherence. Regional governments, operating under decentralization principles, receive inconsistent guidance from national agencies and lack clear authority to coordinate across sectoral silos. The result is a fragmented governance environment where land-use decisions are made without complete understanding of existing rights, restrictions, and responsibilities, and where spatial policies often fail to reflect the reality of land tenure patterns on the ground **(Hendriatiningsih et al., 2020).**

1.2 Research Objectives and Scope

This paper advances three interconnected objectives. First, it provides a **comprehensive analytical mapping of Indonesia's existing institutional landscape for land and spatial governance**, identifying roles, overlaps, gaps, and coordination failures. Second, it identifies **critical regulatory, organizational, and technical barriers that obstruct institutional integration.** Third, it proposes a **conceptual Institutional Integration Framework that demonstrates how land administration and spatial planning** can be unified through coordinated governance structures, interoperable data systems, and harmonized legal frameworks. The framework is presented with explicit policy recommendations for national and subnational implementation, accompanied by discussion of implementation challenges, comparative insights from international experiences, and directions for future research.

The paper focuses on national and subnational levels of governance, recognizing that land and spatial administration in Indonesia operates through multi-level systems. While acknowledging the substantial diversity among Indonesia's 34 provinces and 514 municipalities, the paper develops integration principles applicable across this heterogeneous context while respecting local administrative autonomy and regional diversity.

Type of fragmentation	Main mechanism	Impact on land and spatial governance
Regulatory fragmentation	**ATR/BPN** is responsible for agrarian conversion permits and verification of land rights; **Bappenas** coordinates national spatial planning and ensures development projects align with the national spatial plan; sectoral ministries (forestry, environment, agriculture) regulate land-use within their sectors and issue sector-specific permits and standards; regional governments issue local permits and spatial-plan–based zoning decisions. These institutions operate on different timelines, use different spatial data sources, and apply different land-use category definitions.	Approval from one agency does not guarantee consistency with decisions made by others, producing conflicting policy directions and low predictability.
Technical fragmentation	**ATR/BPN** maintains cadastral databases and parcel maps as the basis for land-rights registration; planning offices in regional governments compile and archive spatial plans (RTRW/RDTR) as the legal reference for allowed land uses; **BIG (Geospatial Information Agency)** produces and manages national geospatial basemaps and reference data; regional governments are expected to integrate these datasets when preparing spatial plans but often lack full access to cadastral data. Each institution uses its own coordinate systems, data formats, and metadata standards.	Zoning decisions frequently ignore existing land rights, land administration officers work without information on authorized land uses, conflicts arise between registered tenure rights and zoning, mapping efforts are duplicated, updating procedures are inconsistent, and the absence of shared digital platforms increases administrative costs and reduces decision quality.
Organizational fragmentation	**ATR/BPN** focuses on land administration and registration; **Bappenas** leads development planning and cross-sector policy coordination; sectoral ministries manage resources and enforce sectoral regulations; **Regional governments** implement decentralised spatial planning and permitting. There are no strong formal mechanisms (e.g., joint working groups, shared information systems, or coordinated review processes) to align these job desks through regular inter-agency dialogue, information exchange, and joint problem-solving.	The governance environment becomes fragmented, land-use decisions are made without complete understanding of existing rights, restrictions, and responsibilities, and spatial policies often fail to reflect actual land-tenure patterns on the ground.

Figure 1. Types of fragmentation in land and spatial governance

2. Analytical Design and Methodology

This study employs a mixed-method analytical approach combining institutional mapping, document analysis, and conceptual framework development. The analysis proceeds through four sequential stages:

2.1 Comprehensive Mapping of the Existing Institutional Landscape

The study produces a systematic depiction of how Indonesia's land and spatial governance institutions currently operate, identifying roles, responsibilities, and overlaps between ATR/BPN, Bappenas, BIG, and regional governments. This mapping visualizes fragmented coordination mechanisms, disconnected data systems, and the organizational duality between land tenure management and spatial planning functions. The analysis specifically highlights institutional gaps that hinder policy coherence and spatial data interoperability, examining both vertical relationships (between national and subnational governments) and horizontal relationships (between sectoral agencies at each level).

2.2 Identification of Key Barriers to Institutional Integration

The analytical framework recognizes that integration is obstructed by three categories of barriers operating simultaneously. Regulatory barriers arise from conflicting legal mandates, inconsistent definitions of core concepts, and absence of statutory requirements for inter-agency coordination. Organizational barriers stem from institutional silos, bureaucratic autonomy, limited communication channels, and weak incentive structures for collaboration. Technical barriers result from non-interoperable databases, incompatible data formats, lack of standardized metadata, and incomplete implementation of digital integration initiatives **(Fitriani & Wicaksono, 2023).** This triadic barrier framework explains why previous integration efforts, including the One Map Policy (KSP) and the National Spatial Data Infrastructure (NSDI) initiative, have remained partial and unsustainable.

2.3 Proposed Institutional Integration Framework

The core analytical output is a conceptual framework describing how land administration and spatial planning can be harmonized institutionally (Paasch & Rajabifard, 2021). The framework proposes coordination mechanisms linking ATR/BPN, BIG, and planning agencies through shared governance structures, incorporates data interoperability standards based on the Land Administration Domain Model (LADM, ISO 19152), a reference conceptual model describing the core components of land administration information (such as people, rights, and spatial units). It is not software or a database by itself, but a standard blueprint that can be adapted into country-specific implementations; establishes legal harmonization pathways and outlines routine inter-agency decision cycles. The framework envisions a multi-level, collaborative governance structure enabling consistent, transparent spatial decision-making across administrative boundaries (Figure 2).

2.4 Policy Recommendations and Implementation Pathways

Finally, the analysis advances actionable policy recommendations to guide national and regional reform, including establishing a National Land and Spatial Integration Council as a permanent coordinating entity; developing standardized data-sharing protocols and geoportal-based governance platforms; and revising overlapping legal provisions to ensure alignment between land rights, land use, and spatial zoning.

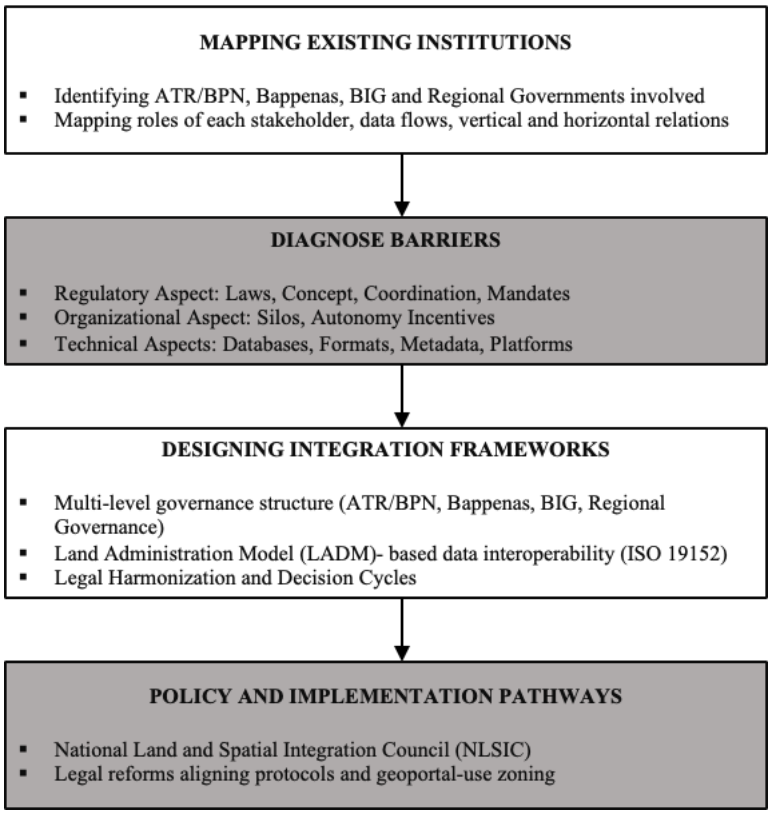

Figure 1. Land and Spatial Data Integration Process for Indonesia

3. Findings and Discussion

3.1 Mapping the Existing Institutional Landscape

The institutional landscape of land and spatial governance in Indonesia reflects a long history of legal and administrative separation between land administration and spatial planning **(Bennett et al., 2021).** The Ministry of Agrarian Affairs and Spatial Planning/National Land Agency (ATR/BPN) holds dual but internally fragmented authority, land administration functions stem from the Basic Agrarian Law (UUPA) of 1960, while spatial planning responsibilities derive from Law No. 26 of 2007. In practice, these two legal regimes have produced parallel bureaucracies with distinct operational cultures, data systems, and accountability lines.

At the national level, spatial policy formulation involves multiple actors, namely ATR/BPN, Bappenas, and BIG; each with partial mandates over land information, spatial data,

or planning coordination. At the sub-national level, provincial and municipal governments translate national frameworks into Rencana Tata Ruang Wilayah (RTRW) and Rencana Detail Tata Ruang (RDTR). However, these plans rarely align with cadastral, or tenure information managed by land offices. The result is a fragmented policy environment where land-use decisions are made without a complete understanding of existing rights, restrictions, and responsibilities (RRR).

The institutional mapping conducted in this study reveals three key features. First, **vertical fragmentation**, the lack of hierarchical synchronization between national and local planning institutions, that leads to inconsistent interpretation of spatial zones and creates conflicting guidance for regional implementation. Second, **horizontal fragmentation,** the separation between land and spatial datasets, creates duplication of mapping efforts and inefficiencies in licensing and investment processes, as different agencies maintain parallel information systems about identical geographic areas. Third, **the absence of an effective integrating node** or coordinating body prevents continuous data exchange and joint decision-making across agencies. This mapping exercise underscores the need for an institutional bridge that unifies these disconnected governance systems under a coherent framework.

3.2 Key Barriers to Institutional Integration

3.2.1 Regulatory Barriers

The dual legal foundation of Indonesia's land and spatial sectors perpetuates structural incoherence. The UUPA 1960 provides a rights-based foundation emphasizing tenure security and individual land rights recognition, while the Spatial Planning Law 26/2007 focuses on spatial function and environmental balance. Neither law explicitly mandates inter-system interoperability nor establishes mechanisms for coordinating land rights with spatial planning decisions. Consequently, ministries operate under different statutory logics, ATR/BPN prioritizing land registration and tenure documentation, while planning agencies emphasize zoning compliance and land-use control. Overlapping provisions on land allocation, particularly in contested zones such as forestry reserves, agricultural protection areas, and mining concessions, further complicate coordination. When multiple laws assert authority over the same territory, implementing agencies face unclear mandates and lack institutional mechanisms to resolve conflicts systematically.

3.2.2 Organizational Barriers

Institutional silos within and across government agencies inhibit effective coordination **(Azevedo-Ramos et al., 2018).** The bureaucratic culture of ATR/BPN emphasizes cadastral administration following registration protocols, whereas planning offices follow development-planning procedures guided by Bappenas methodologies and timelines. Limited communication channels and unclear mandate boundaries often lead to redundant decisions or contradictory requirements. Regional governments, although empowered through decentralization reforms, lack consistent guidance and technical capacity to synchronize land and spatial datasets. Training programs rarely address inter-agency coordination, and promotion incentives focus on agency-specific performance rather than system-wide outcomes.

These conditions reflect a governance system dominated by authority fragmentation rather than collaborative integration.

3.2.3 Technical Barriers

Technological fragmentation mirrors institutional disconnection. Despite significant investment in spatial data infrastructures through the One Map Policy (KSP) and National Spatial Data Infrastructure (SDI) initiatives, integration remains incomplete. Cadastral maps are maintained separately from spatial plans, often operating under different coordinate systems, scale standards, and attribute definitions. In many districts, planning documents exist only as static images or hard-copy maps rather than interoperable geospatial layers that can be digitally linked with other datasets. The absence of common metadata standards and insufficient adoption of the Land Administration Domain Model (ISO 19152) limit interoperability between cadastral and planning systems **(International Federation of Surveyors, 2022).** Different agencies maintain different versions of geographic truth, leading to inconsistent spatial analyses and conflicting planning decisions. These barriers jointly produce a governance environment characterized by regulatory ambiguity, institutional redundancy, and data incompatibility, collectively hindering policy coherence and efficient spatial decision-making.

3.3 Proposed Institutional Integration Framework

In response to these challenges, this study proposes a comprehensive Institutional Integration Framework designed to unify land administration and spatial planning through three complementary mechanisms, governance coordination, data interoperability, and legal harmonization **(Rahmi & Mardiatmoko, 2023).** The framework operates as an integrated system where each component reinforces the others, creating conditions for sustainable institutional integration (Figure 3).

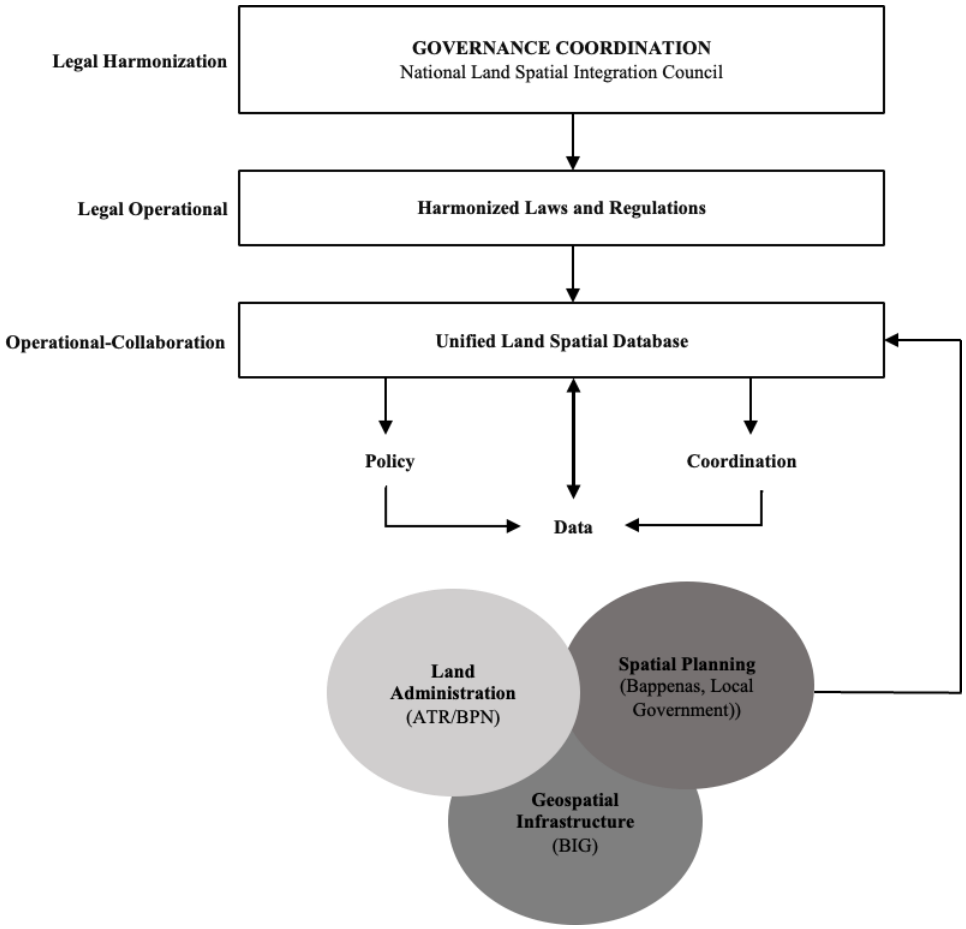

Figure 3. Multi-Level Land–Spatial Governance and Unified Land Spatial Database Framework

3.3.1 Governance Coordination Mechanism

The framework envisions the establishment of a **National Land and Spatial Integration Council (NLSIC)** as an inter-ministerial coordination platform operating under Presidential authority. This council would serve as a formal institutional bridge between ATR/BPN, Bappenas, BIG, and subnational governments (regional governments), ensuring consistent policy direction and joint monitoring of spatial data. The council's mandate includes setting integration standards; facilitating data exchange and system interoperability; resolving cross-sectoral conflicts through structured decision processes; and aligning national spatial priorities with local implementation needs. The NLSIC would operate through standing committees addressing data governance, legal harmonization, capacity building, and monitoring. By centralizing inter-agency coordination at a high political level, the council ensures that integration remains a strategic priority rather than a discretionary administrative activity.

3.3.2 Data Interoperability Mechanism

At the technical level, integration would be enabled through an interoperable spatial data infrastructure built upon the Land Administration Domain Model (LADM) framework **(Paasch & Rajabifard, 2021).** This system links cadastral and planning datasets via standardized spatial identifiers, allowing both sectors to access and update shared geospatial information in real time. The mechanism integrates Rights, Restrictions, and Responsibilities (RRR) data within spatial zoning layers, thereby enhancing the accuracy of land-use decisions and reducing duplication of mapping efforts. The One Map Policy serves as the technical foundation for this interoperability layer, with BIG coordinating standardization across agencies. The unified database would operate according to ISO 19152 standards, employ common coordinate reference systems, and utilize consistent metadata descriptions enabling seamless data exchange among cadastral, planning, and environmental information systems.

3.3.3 Legal Harmonization Mechanism

A third integration pillar involves aligning regulatory frameworks to eliminate conflicts and overlapping mandates **(Ministry of Agrarian Affairs and Spatial Planning, 2024).** The framework recommends systematically revising or harmonizing key legal instruments, particularly the UUPA 1960, Spatial Planning Law 26/2007, and related sectoral regulations governing forestry, agriculture, mining, and environmental protection- so that integration becomes a statutory obligation rather than an administrative preference. Legal harmonization ensures that all agencies operate under shared definitions of land information, spatial data, and authority boundaries. Rather than creating entirely new legislation, harmonization would involve coordinated amendments establishing explicit coordination requirements, defining jurisdictional boundaries, and creating dispute resolution mechanisms for inter-agency conflicts.

Collectively, these three mechanisms promote an integrated governance ecosystem where institutions collaborate through shared standards, transparent data flows, and unified policy objectives. The framework represents not a new institution per se, but a systemic redesign of inter-institutional relations anchored in principles of interoperability, coordination, and subsidiarity.

3.4 Policy Recommendations and Implementation Pathways

To operationalize the proposed framework, this study advances four major policy recommendations grounded in analytical findings and comparative international experience.

3.4.1 Establish a Permanent Coordinating Entity

The government should institutionalize the National Land and Spatial Integration Council under the Presidential Office to ensure cross-sectoral authority at the highest political level. This body must include both technical and policy divisions addressing data governance, regulatory alignment, and institutional monitoring. The NLSIC should be legislatively established through Presidential Decree, with clear mandate authority, established procedures, and dedicated budget. Institutional design should include: (1) steering committee at Minister level providing political direction; (2) technical working groups addressing specific integration domains (data interoperability, legal harmonization, capacity building); (3) secretariat function

coordinating implementation and monitoring; and (4) regular plenary sessions (at least quarterly) assessing integration progress and resolving inter-agency conflicts.

3.4.2 Develop Standardized Data-Sharing Protocols

Interoperability must be mandated through a national geospatial platform integrating cadastral and planning data under common technical standards. Adoption of ISO 19152 (LADM) as the common standard would enable multi-agency synchronization and reduce data inconsistencies **(World Bank, 2023).** This requires:

a. establishment of a National Geoportal for Integrated Land and Spatial Information serving as the authoritative source for all land and spatial data.
b. development of standardized Application Programming Interfaces (APIs) enabling seamless data exchange among agency systems.
c. implementation of common coordinate reference systems (WGS84 / UTM) across all cadastral, planning, and geospatial databases.
d. adoption of consistent metadata standards (ISO 19115) describing data content, quality, and update frequency, and
e. transition of planning documentation from static images to interoperable geospatial layers.

Open-access principles should guide the geoportal, enhance transparency and public accountability while enable citizen engagement in spatial governance.

3.4.3 Reform Overlapping Legal Provisions

Regulatory simplification should focus on systematically merging key clauses of land and spatial laws that currently produce conflicting interpretations. Rather than comprehensive legislative overhaul, harmonization should involve coordinated amendments to existing legal instruments establishing:

a. explicit requirements for inter-agency coordination in land-use decision making.
b. clear definitions of jurisdictional boundaries between cadastral and planning authority.
c. mandatory procedures for resolving jurisdictional conflicts.
d. unified requirements for spatial data standards and updating procedures
e. integration of environmental and sectoral considerations into both land administration and spatial planning processes.

Harmonized legislation will clarify mandates, establish cross-reference definitions linking land tenure with spatial function, and mandate collaboration in spatial decision-making processes. The government should establish an inter-ministerial working group dedicated to legal harmonization, operating on a defined timeline with clear deliverables.

3.4.4 Build Institutional and Human Resource Capacity

Sustainable integration depends on local government capacity to implement harmonized systems (Enemark, 2014). Training programs should be developed for:

a. cadastral officers preparing them to interact with spatial planning systems.
b. planners understanding cadastral information and its relationship to spatial zoning; and

c. geospatial technicians capable of operating shared platforms and maintaining unified standards.

Capacity-building efforts must be embedded in national spatial governance strategies and funded through inter-ministerial collaboration. This requires:

a. development of curriculum materials addressing cross-sectoral coordination.
b. establishment of certification programs ensuring technical competence.
c. creation of collaborative learning platforms enabling peer exchange and problem-solving, and
d. deployment of technical advisors supporting regional implementation.

3.5 Discussion: Integration as Technical and Political Process

The proposed framework advances the understanding of institutional integration as both a technical and political process. It extends beyond data harmonization to encompass reconfiguration of authority, accountability, and decision-making structures. Comparative insights from international experiences, particularly from the Netherlands, Denmark, and Colombia, suggest that integration succeeds when supported by strong political leadership, statutory mandates, and long-term institutional commitment **(Bennett et al., 2021).**

In the Netherlands, the integration of cadastral and planning systems emerged from strategic national policy decisions elevating land governance to high political priority, supported by dedicated funding and sustained inter-agency coordination over decades. Denmark achieved integration through comprehensive legal harmonization embedding coordination requirements in planning legislation, coupled with early adoption of digital standards enabling data exchange. Colombia's more recent experience demonstrates that integration remains possible even in contexts with significant institutional fragmentation, though it requires sustained political commitment and adaptive learning as implementation challenges emerge.

Indonesia's context, marked by significant decentralization and sectoral institutional autonomy. It requires adaptive governance arrangements that respect local diversity while maintaining national coherence. The proposed framework provides a pathway balancing these tensions through:

a. centralized establishment of integration standards and coordination mechanisms at national level.
b. flexibility in implementation approaches accommodating local contexts and administrative capacities.
c. respect for sectoral agency expertise while establishing coordination requirements, and
d. gradual expansion of integration beginning with high-priority areas and progressively encompassing additional sectors.

4. Benefits and Impacts of Institutional Integration

Implementation of the proposed framework promises substantial benefits across multiple governance dimensions:

4.1 Economic Benefits

Integrated land and spatial governance reduce administrative complexity and accelerate investment processes. By eliminating duplicative approval procedures, standardizing data requirements, and establishing clear decision timelines, the framework promises to reduce time-to-approval for major development projects by 30-40 percent. Improved legal certainty regarding land rights and land-use permissions reduces investment risk premiums and facilitates long-term project financing. More efficient licensing processes increase government revenue from project fees while reducing processing costs.

4.2 Social and Equity Benefits

Integration improves transparency in land governance, reducing opportunities for corruption and discretionary decision-making. Unified geospatial databases make land information publicly accessible, enabling citizens to verify land rights, understand permitted land uses, and participate more effectively in spatial planning processes. Clearer alignment between land rights and land-use designations protects existing landholders from arbitrary spatial rezonings, particularly important for smallholders and vulnerable communities. Reduced regulatory uncertainty improves tenure security for existing rights holders.

4.3 Environmental and Sustainability Benefits

Integrated spatial governance enables more coherent environmental planning and implementation. By aligning land tenure data with environmental zoning and land-use restrictions, the framework facilitates better enforcement of environmental protections, particularly in forestry, wetland, and coastal zone management. Unified databases make it possible to track environmental compliance across entire territories, rather than through fragmented sectoral monitoring. Integration supports more effective implementation of climate adaptation and mitigation strategies embedded in spatial plans, as land administration systems can verify that land use aligns with approved climate-resilient development patterns.

4.4 Administrative Efficiency Benefits

Integration reduces bureaucratic costs through elimination of parallel data collection and maintenance systems. A single unified database reduces redundancy costs, improves data consistency, and enables economies of scale in system maintenance. Inter-agency coordination through the NLSIC provides a structured forum for resolving conflicts, replacing ad-hoc negotiation processes that currently consume considerable administrative resources. Standardized procedures and data formats reduce training requirements and facilitate staff mobility across agencies.

5. Implementation Considerations and Challenges

5.1 Political Economy Challenges

Implementation of the proposed framework faces significant political economy obstacles. Existing institutional arrangements reflect entrenched interests within ATR/BPN, Bappenas, BIG, and regional governments. Each agency has developed procedures, staff

expertise, and resource allocations adapted to current institutional boundaries. Integration threatens existing authority structures and requires agencies to cede some autonomy to coordinating mechanisms. Successful implementation therefore demands explicit political commitment from senior leadership, coupled with transition management ensuring that agency staff perceive integration as enhancing rather than threatening their institutional roles.

5.2 Technical Implementation Challenges

Implementing data interoperability at national scale presents substantial technical challenges. Existing cadastral, planning, and geospatial databases differ significantly in coordinate systems, data formats, metadata standards, and update procedures. Retrofitting these systems to operate according to unified standards requires significant investment in system redesign, data conversion, and IT infrastructure. Regional governments operate with limited IT capacity, requiring substantial capacity-building investment and potentially ongoing technical support.

5.3 Coordination and Sequencing

Implementation must proceed through carefully sequenced phases, beginning with foundational elements and progressively building more complex integrations. Initial phases should focus on establishing the NLSIC and clarifying mandates; harmonizing data standards in pilot areas; conducting legal harmonization analysis; and building initial staff capacity. Subsequent phases expand geographic coverage and sectoral integration while learning from early implementation experiences.

6. Conclusion and Recommendation

This study concludes that Indonesia's fragmented institutional arrangement between land administration and spatial planning has become a structural constraint to achieving coherent, efficient, and sustainable land governance **(World Bank, 2023).** Although both systems share the common objective of regulating land use and ensuring spatial justice, they operate under distinct legal frameworks, institutional hierarchies, and data infrastructures. **The absence of formal mechanisms to connect these regimes has resulted in overlapping authority, incoherent spatial policies, and inconsistent geospatial information.**

The proposed Institutional Integration Framework addresses these weaknesses through a tripartite mechanism combining governance coordination, data interoperability, and legal harmonization. This framework is not intended as new bureaucracy but rather as **systemic redesign of institutional relationships facilitating cross-sectoral communication, synchronized decision-making, and policy coherence**. Implementation promises substantial benefits in administrative efficiency, economic growth, social equity, and environmental sustainability.

Realizing these benefits demands not only technical interoperability but also institutional learning, policy coherence, and leadership commitment across all levels of government. The government should prioritize immediate establishment of the National Land and Spatial Integration Council as the institutional anchor, coupled with systematic development of data interoperability standards and legal harmonization. This framework **offers**

a pathway toward more connected, transparent, and accountable land governance, essential for supporting Indonesia's vision for sustainable territorial development in coming decades.

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BIOGRAPHICAL NOTES

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