



The Effectiveness of Policy Implementation of Rice Land Conversion Control to Support National Food Security in Karawang Regency West Java Province

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Abstract

Rice field conversion has become a critical governance issue in regions where food security objectives intersect with industrial and urban expansion. This study analyzes the effectiveness of rice field conversion control policy in supporting national food security in Karawang Regency, West Java Province, Indonesia. Karawang is a strategic rice-producing region, yet it also functions as a major industrial growth area, creating persistent pressure on productive paddy fields. Using a qualitative case study design, data were collected from 35 informants representing policy makers, policy implementers, farmers, academics, journalists, and community actors through semi-structured interviews, field observation, and document review. The data were analyzed through thematic analysis using five dimensions of policy implementation effectiveness: appropriate policy, appropriate implementation, appropriate target, appropriate environment, and appropriate process. The analysis was expanded by examining compensation adequacy and policy synchronization as emerging empirical dimensions. The findings show that the policy has a strong formal foundation and is relevant to agricultural land protection, but its implementation remains only partially effective. Limited public understanding of LP2B, uneven field supervision, weak target achievement, insufficient farmer incentives, and poor alignment between agricultural protection and industrial development continue to constrain policy effectiveness. This study contributes to policy implementation literature by positioning compensation adequacy and policy synchronization as central dimensions of land-use governance in rapidly industrializing agricultural regions. Practically, the study recommends stronger LP2B socialization, integrated inter-agency monitoring, fairer farmer support schemes, and agro-industrial policy alignment to protect productive rice fields and strengthen sustainable food security.

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INTRODUCTION

Food security has become an increasingly strategic concern as agricultural systems face growing pressure from urban expansion, industrial development, infrastructure growth, and demographic change. In many developing countries, productive agricultural land is not merely an economic asset but also a foundation for food availability, rural livelihoods, and long-term national resilience. The conversion of paddy fields into non-agricultural uses can reduce cultivated areas, weaken rice production capacity, and create structural vulnerability in food supply systems. This issue is particularly important in rice-dependent countries, where domestic food stability is closely

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linked to the protection of irrigated agricultural land. Recent studies emphasize that farmland protection should not be understood only as a spatial planning issue, but also as a governance problem involving policy design, institutional coordination, land-use control, and farmer incentives (Koelman et al., 2025; Liu, 2024). Therefore, the effectiveness of agricultural land conversion control has become a crucial policy issue in regions experiencing rapid land-use transformation.

In Indonesia, the conversion of productive rice fields has become a persistent policy challenge because rice remains the country's main staple food and a strategic commodity for national food security. The government has introduced Sustainable Food Agricultural Land Protection through Law Number 41 of 2009 to maintain agricultural land availability and prevent uncontrolled land conversion. However, previous studies show that the implementation of agricultural land protection policies often remains uneven because of weak enforcement, limited socialization, fragmented coordination, and strong economic pressure from non-agricultural land uses (Su et al., 2024; Zang et al., 2022). This problem becomes more complex in regions where productive agricultural land directly competes with industrial estates, housing areas, transportation networks, and urban facilities. Karawang Regency in West Java reflects this dilemma because it serves both as a major rice-producing region and as an important industrial growth center. The manuscript data show that food crop land in Karawang declined from 99,910.187 hectares to 90,661.929 hectares during the 2011–2021 period, indicating a conversion of approximately 9,248.258 hectares. This empirical condition confirms that the existence of formal regulations has not fully prevented the conversion of productive paddy fields in practice.

Karawang's strategic role in food security is supported by its extensive agricultural land and technical irrigation system, including the Jatiluhur irrigation network, which enables rice cultivation throughout the year (Sutardi et al., 2022; Tirtalistyani et al., 2022). The regency has also been recognized as one of West Java's important rice-producing areas, with a substantial rice surplus that contributes beyond local consumption needs. At the same time, the expansion of industrial estates such as Karawang International Industrial City and Surya Cipta Industrial Estate has intensified demand for housing, logistics, trade facilities, roads, and public services. This condition creates a structural tension between agricultural land protection and industrial development, particularly in regions where food production areas overlap with investment corridors (Gu et al., 2024; Kayes et al., 2026). On the one hand, Karawang is expected to maintain its function as a rice barn that supports regional and national food supply. On the other hand, the region is also positioned as a strategic industrial area that supports investment and economic growth. If this tension is not managed through effective policy implementation and spatial governance, protected rice fields may continue to decline despite the presence of land protection regulations.

The regulatory framework for controlling rice field conversion in Karawang is formally available through several national and local policy instruments. At the national level, Law Number 41 of 2009 provides the legal basis for protecting sustainable food agricultural land, while Presidential Regulation Number 59 of 2019 strengthens the national agenda for controlling rice field conversion. At the local level, Karawang Regency has issued Regional Regulation Number 2 of 2013 on spatial planning, Regional Regulation Number 1 of 2018 on Sustainable Food Agricultural Land Protection, and Regent Regulation Number 91 of 2022 concerning LP2B area, distribution, incentives, disincentives, conversion, and development (Efata et al., 2026). These policy instruments indicate that the government has institutionally recognized the importance of protecting productive agricultural land. Nevertheless, policy effectiveness depends not only on the existence of regulations but also on public understanding, implementation accuracy, supervision capacity, compensation mechanisms, and coordination across sectors (Boufounou et al., 2024). This condition makes Karawang an important case for examining the gap between formal policy design and actual implementation outcomes in the field.

Previous studies have shown that agricultural land conversion is commonly driven by urban expansion, rising land prices, industrialization, weak law enforcement, and limited farmer participation. Yang & Solangi, (2024) found that the implementation of sustainable agricultural land protection was constrained by unclear incentives and weak institutional coordination. Widayat et al., (2023) showed that policy implementation in Bandung Regency remained ineffective because socialization and enforcement had not sufficiently reached farming communities. Sharma et al., (2022) emphasized that community participation in agricultural land protection often remains

reactive and has not been institutionalized within the spatial planning process. Dogaru et al., (2024), through a systematic review, further concluded that fragmented governance and inconsistent policy implementation are recurring challenges in sustainable agricultural land protection. These studies indicate that land conversion is not only a technical-spatial problem but also an institutional, economic, and socio-political issue.

Other studies have linked paddy field conversion to declining food security and long-term agricultural vulnerability. Wang, (2022) demonstrated that the conversion of paddy fields into developed land can threaten regional food security by reducing future rice production capacity. Faoziyah et al., (2024) argued that Indonesia's agricultural land-use dynamics reflect a tension between food security objectives and policy interventions. Kholik et al., (2024) specifically highlighted that agricultural land conversion in Karawang poses a threat to food security and rice self-sufficiency. However, most previous studies still focus on mapping land conversion, describing regulatory obstacles, or evaluating formal policy compliance. Less attention has been given to how policy implementation effectiveness can be strengthened through compensation adequacy and cross-sector policy synchronization. This gap is important because land conversion control cannot rely only on zoning, prohibition, or administrative regulation; it must also consider farmer welfare and the alignment between agricultural, industrial, investment, and spatial planning policies.

Based on this background, this study aims to analyze the effectiveness of rice field conversion control policy implementation in supporting national food security in Karawang Regency, West Java Province. The analysis is guided by the five dimensions of policy implementation effectiveness, namely appropriate policy, appropriate implementation, appropriate target, appropriate environment, and appropriate process. In addition, this study examines two complementary dimensions, namely compensation adequacy and policy synchronization, which emerged as critical factors in the implementation of agricultural land protection policy. Theoretically, this study contributes to policy implementation literature by extending the existing effectiveness framework with two empirically grounded dimensions relevant to land-use governance in rapidly industrializing agricultural regions. Practically, this study provides recommendations for strengthening policy socialization, improving field supervision, designing fairer compensation schemes, and aligning agricultural protection with industrial development. By focusing on Karawang, this research offers an integrated governance perspective that connects agricultural land protection, farmer welfare, spatial planning, and regional economic development.

METHOD

Research Design

This study employed a qualitative case study design to examine the effectiveness of rice field conversion control policy implementation in Karawang Regency, West Java Province. A case study design was selected because the research focused on a contemporary policy issue that needed to be understood within its real governance context (Cannas et al., 2024; Irani et al., 2023). The qualitative approach was appropriate because the study explored how policy makers, implementers, farmers, and other stakeholders understood, implemented, and responded to rice field conversion control policy (Berg et al., 2023; Kundu et al., 2024). This design enabled the researchers to analyze not only the formal existence of policy instruments but also the interaction between policy design, institutional capacity, public understanding, compensation, and policy synchronization. Karawang Regency was treated as a strategic case because it represents a region where agricultural land protection, food security, industrial expansion, and spatial planning directly intersect.

Study Area and Research Context

The research was conducted in Karawang Regency, West Java Province, Indonesia. Karawang was selected purposively because it has a dual role as one of West Java's important rice-producing areas and as a major industrial growth center. This dual role creates a direct tension between the protection of productive paddy fields and the demand for industrial, residential, and infrastructure development. The manuscript data show that food crop land in Karawang decreased from 99,910.187 hectares to 90,661.929 hectares during the 2011–2021 period, indicating a conversion of approximately 9,248.258 hectares. This condition makes Karawang a relevant site for examining the gap between agricultural land protection policy and actual land-use change in the field.

Participants and Sampling

The study involved 35 informants selected through purposive sampling. Purposive sampling was used because the research required participants who had authority, institutional responsibility, field experience, or direct knowledge of rice field conversion control policy (Limpo et al., 2022; Nguyen et al., 2024). The informants consisted of three main groups: policy makers, policy implementers, and community or external stakeholders. Policy makers provided information on policy direction, regional planning, and strategic decision-making. Policy implementers explained licensing, supervision, enforcement, spatial planning, and agricultural protection practices. Farmers, academics, journalists, and community actors provided field-level perspectives on policy acceptance, compensation, land-use pressure, and public understanding. Interviews were continued until thematic saturation was reached, when additional interviews no longer produced substantially new information relevant to the research focus (Hennink & Kaiser, 2022).

Table 1. Characteristics of Research Informants

Stakeholder group	Informant category	Main contribution to the study
Policy makers	Regent, DPRD, Bappeda, and heads of relevant agencies	Explained policy direction, planning, and strategic decisions
Policy implementers	Agriculture office, PUPR, licensing agency, Satpol PP, and land-related institutions	Explained implementation, supervision, licensing, and enforcement
Community and external stakeholders	Farmers, academics, journalists, and local actors	Provided field perspectives on policy acceptance, compensation, and land-use pressure
Total	35 informants	Represented institutional and community perspectives

Table 1 shows that the study involved actors from different policy positions. This composition was used to ensure that the findings did not rely only on government perspectives but also reflected field-level experiences.

Data Collection

Data were collected through semi-structured interviews, field observation, and document review. Semi-structured interviews were used because this technique allows researchers to maintain consistency across participants while still giving informants space to explain their experiences in depth (Alexander & Varley, 2025; Belina, 2023). The interviews focused on seven analytical dimensions: appropriate policy, appropriate implementation, appropriate target, appropriate environment, appropriate process, compensation adequacy, and policy synchronization. Field observation was conducted to understand the local context of rice field protection, land-use pressure, and indications of conversion. Observation was important because qualitative fieldwork helps connect stakeholder narratives with visible field conditions (Bahnasy, 2024). Document review was conducted on national regulations, local regulations, LP2B policy documents, spatial planning documents, agency reports, and administrative records. Document analysis was used because policy documents provide institutional evidence that can be compared with interview and observation data (Sajadi et al., 2024).

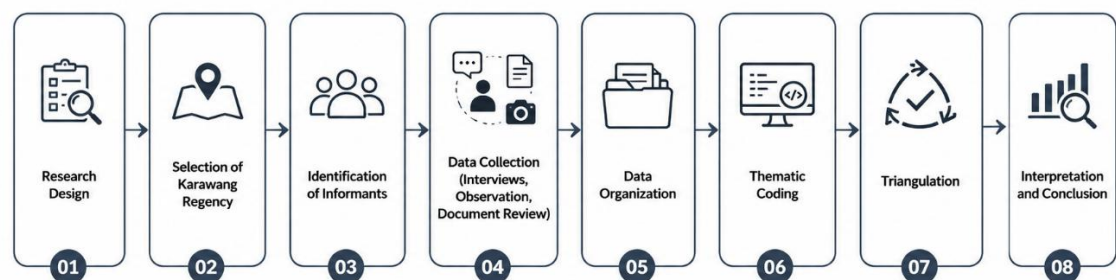


Figure 1. Research Workflow

Figure 1 presents the sequence of the research process. The workflow shows that data were not interpreted from a single source, but through comparison between interviews, field observations, and policy documents.

Research Instruments and Data Management

The main instrument in this study was the researcher, supported by interview guidelines, observation notes, and document review sheets. In qualitative research, the researcher acts as the primary instrument because interpretation depends on the researcher's ability to understand meaning, context, and interaction in the field (Tisdell et al., 2025). The interview guideline was developed from five dimensions of policy implementation effectiveness: appropriate policy, appropriate implementation, appropriate target, appropriate environment, and appropriate process. Two additional dimensions, compensation adequacy and policy synchronization, were added because preliminary field indications showed that farmer incentives and cross-sector policy alignment were central to the effectiveness of rice field conversion control. Interview data were organized based on informant category, institutional role, key statement, analytical dimension, and emerging theme. Observation notes were classified according to location, observed issue, and relevance to land conversion control. Policy documents were recorded according to document type, issuing institution, year, and relevance to agricultural land protection.

Data Analysis

The data were analyzed using qualitative thematic analysis. Thematic analysis was chosen because it enables researchers to identify and interpret patterns of meaning across interview, observation, and document data (Christou, 2024). The analysis began with data familiarization through repeated reading of interview notes, field records, and policy documents. Initial coding was then conducted by labeling statements related to policy design, implementation actors, target achievement, institutional coordination, compensation, and policy synchronization. Pattern coding was used to group similar codes into broader categories, following the principle that coding should move from descriptive labels to analytical interpretation (Oliveira, 2023). These categories were then refined into themes explaining the effectiveness and limitations of rice field conversion control policy in Karawang. The final interpretation followed the stages of data condensation, data display, and conclusion drawing (Kaddoura et al., 2025).

Trustworthiness and Reflexivity

Trustworthiness was maintained through credibility, transferability, dependability, and confirmability. Credibility was strengthened by comparing information from different stakeholder groups, including government officials, technical implementers, farmers, academics, journalists, and community actors. Method triangulation was applied by comparing interview findings with field observation and documentary evidence. Transferability was supported by describing the research context, informant groups, and policy setting clearly so that readers can assess the relevance of the findings to other regions. Dependability was maintained by documenting the research procedure, data organization, coding process, and analytical decisions. Confirmability was strengthened by grounding the findings in recurring evidence across different sources rather than relying on a single informant. Researcher reflexivity was also applied because qualitative researchers need to recognize and manage the influence of their own assumptions during interpretation (Peddle, 2022).

Research Ethics

This study followed the principles of voluntary participation, informed consent, confidentiality, and academic integrity. Before the interviews, informants were informed about the purpose of the study, the type of information required, and their right to decline or stop participation at any stage. Personal and sensitive information was not disclosed in the analysis to protect the identity and institutional position of participants. The data were used only for academic purposes and were reported in aggregated or anonymized form where necessary. All regulations, documents, and previous studies used in the analysis were cited properly to maintain transparency and avoid academic misconduct.

RESULTS AND DISCUSSION

Results

The results of this study are presented to show how rice field conversion control policy operates in practice within the governance context of Karawang Regency. The analysis does not only focus on whether the policy exists formally, but also examines how it is understood, implemented,

supervised, and supported by relevant actors in the field. The findings are organized around seven analytical dimensions to provide a clear picture of the strengths, weaknesses, and emerging factors that shape policy effectiveness. This structure allows the results to move from general implementation conditions to more specific issues related to farmer support and cross-sector policy alignment.

Overview of Rice Field Conversion Policy Implementation

The findings show that the implementation of rice field conversion control policy in Karawang Regency has a strong formal foundation but has not yet achieved full effectiveness in practice. The policy is supported by spatial planning regulations, sustainable food agricultural land protection instruments, and technical rules related to LP2B. These instruments indicate that the protection of productive paddy fields has been institutionally recognized as an important part of regional food security governance.

However, field findings indicate that the existence of regulation alone has not been sufficient to prevent rice field conversion. Several implementation weaknesses remain visible, particularly in public understanding, field supervision, compensation mechanisms, and cross-sector coordination. Farmers and community actors do not always understand the formal meaning of LP2B, while some land-use changes continue to occur in areas exposed to settlement, industrial, and infrastructure pressure. This shows that the main challenge lies not in the absence of policy, but in the gap between policy design and implementation capacity.

Table 2. Summary of Findings Based on Seven Analytical Dimensions

No.	Analytical Dimension	Key Empirical Finding	Assessment
1	Appropriate policy	The policy is relevant to the protection of productive paddy fields and is supported by national and local regulations.	Relatively strong
2	Appropriate implementation	Several institutions are involved, but socialization, public understanding, and field supervision remain limited.	Not fully optimal
3	Appropriate target	The target is appropriate, but indications of rice field conversion are still found in several locations.	Not fully achieved
4	Appropriate environment	Institutional roles have been established, but coordination and data integration require improvement.	Relatively good
5	Appropriate process	Policy formulation has followed formal procedures, but community-level readiness remains uneven.	Relatively good
6	Compensation adequacy	Existing incentives are not yet sufficient to meet farmers' economic and welfare expectations.	Weak
7	Policy synchronization	Agricultural protection and industrial development policies are not yet fully aligned.	Weak

Table 2 summarizes the main empirical findings across the seven dimensions of policy implementation effectiveness. The strongest dimensions are policy relevance, institutional environment, and formal process. The weakest dimensions are compensation adequacy and policy synchronization, indicating that policy effectiveness depends not only on regulation but also on farmer support and cross-sector policy alignment.

Policy Effectiveness: Policy Relevance and Target Achievement

The policy of controlling rice field conversion in Karawang Regency is considered relevant to the problem being addressed. Karawang has extensive productive paddy fields and continues to play an important role in supporting rice production. For this reason, policies that protect agricultural land are necessary to prevent uncontrolled conversion into non-agricultural uses. The findings show that the policy direction is consistent with the region's need to maintain productive land amid industrial, residential, and infrastructure expansion.

Although the policy is relevant, its target has not been fully achieved. The main target is to protect productive paddy fields from conversion, yet field findings still indicate land-use changes in several areas. This gap appears especially in locations close to settlement growth, industrial estates, and infrastructure development. Administratively, paddy field protection has been regulated

through spatial planning and LP2B instruments. In practice, however, small-scale and self-initiated conversion remains difficult to monitor. This condition shows that policy relevance does not automatically produce target achievement when supervision and enforcement remain limited.

Implementation Performance: Actors, Coordination, and Process

The implementation of rice field conversion control involves several institutions, including agencies responsible for agriculture, spatial planning, licensing, enforcement, and regional development. Each institution has a formal role in supporting policy implementation, ranging from planning and licensing to supervision and enforcement. This institutional structure indicates that the policy environment has been established and that rice field protection is not handled by a single agency alone.

However, implementation performance remains uneven. Coordination among institutions tends to operate through formal administrative procedures, while field-level integration is still limited. Shared data, joint monitoring, and consistent communication among agencies are not yet fully optimized. This creates a fragmented implementation pattern, where policy control may become reactive rather than preventive.

At the community level, policy communication remains a major weakness. Some farmers understand agricultural zoning only in practical terms, such as “green zone” and “yellow zone,” but do not fully understand the legal meaning, boundaries, and consequences of LP2B. This indicates that socialization has not reached all affected groups effectively. As a result, policy implementation is stronger at the institutional level than at the community level. The process of policy internalization therefore remains incomplete, especially among farmers who are directly affected by land protection rules.

Emerging Findings: Compensation Adequacy and Policy Synchronization

Two important findings emerged beyond the five original dimensions of policy implementation effectiveness: compensation adequacy and policy synchronization. Compensation adequacy is important because farmers are directly affected by agricultural land protection policies. The local government has provided several forms of support, including tax relief, agricultural infrastructure assistance, farming machinery, crop insurance, and facilitation of agricultural inputs. These efforts show that the government has attempted to reduce the burden on farmers.

However, existing compensation is not yet considered sufficient by farmers. Tax relief is limited, fertilizer subsidies are not always accessible, and crop insurance has not been evenly distributed. Farmers expect broader and more concrete support, including guaranteed fertilizer availability, farming capital, superior seeds, post-harvest facilities, social protection, and stable selling prices. This finding indicates that compensation should not be treated merely as fiscal relief, but as part of a broader farmer welfare system that enables agricultural land protection to be socially acceptable and economically viable.

Policy synchronization also emerged as a critical dimension. Agricultural protection policy and industrial development policy in Karawang have not been fully aligned. On one side, the government seeks to protect productive paddy fields through LP2B and spatial planning regulations. On the other side, industrial growth continues to create demand for housing, roads, logistics, trade facilities, and supporting infrastructure. This creates indirect pressure on paddy fields, especially in areas surrounding industrial and urban development corridors.

The findings suggest that agriculture and industry should not be positioned as opposing sectors. Instead, both need to be connected through a more integrated regional development strategy. An agro-industrial approach can become one possible pathway because it allows agricultural products to gain added value while maintaining productive land. In this sense, policy synchronization is not merely an administrative requirement, but a strategic condition for reducing sectoral conflict and strengthening long-term food security.

Empirical Model of Rice Field Conversion Control Policy Effectiveness

Based on the findings, rice field conversion control in Karawang Regency requires more than formal legal protection. Policy effectiveness depends on the interaction between policy foundation, implementation capacity, target achievement, farmer support, and cross-sector synchronization. The findings show that compensation adequacy and policy synchronization are not supporting factors

alone, but central dimensions that shape whether land conversion control can be implemented effectively.



Figure 2. Empirical Model of Rice Field Conversion Control Policy Effectiveness

Figure 2 presents the empirical model developed from the study findings. The model shows that effective rice field conversion control begins with a strong formal policy foundation, but it can only work when supported by implementation capacity, target control, farmer welfare support, and policy synchronization. The model also highlights the main contribution of this study: compensation adequacy and policy synchronization are essential dimensions in strengthening the effectiveness of rice field conversion control policy in rapidly industrializing agricultural regions.

Discussion

The findings show that rice field conversion control policy in Karawang is formally relevant, yet its effectiveness remains constrained at the implementation level. This indicates that the main weakness does not lie in the absence of policy design, but in the limited capacity to translate legal instruments into consistent field control. In the five-appropriateness framework, the “appropriate policy” dimension is fulfilled because the policy responds to a real governance problem: the pressure of industrial, residential, and infrastructure expansion on productive paddy fields. However, the persistence of land conversion suggests that policy relevance alone is insufficient when monitoring, enforcement, and local compliance mechanisms are weak. One possible explanation is that land-use regulations primarily define what should be protected, but they do not automatically change the economic incentives that encourage landowners to convert agricultural land. This finding is consistent with studies showing that agricultural land protection often becomes ineffective when spatial regulation is not supported by strong enforcement and institutional follow-through (Yang & Solangi, 2024; Widayat et al., 2023). Therefore, the Karawang case confirms that policy effectiveness should be understood as the result of interaction between legal design, field supervision, and socio-economic compliance.

The second important finding is the gap between institutional implementation and community-level understanding. Although several agencies are formally involved in controlling rice field conversion, the policy has not been fully internalized by farmers and local communities. This weakens the “appropriate implementation” dimension because implementation is not only a bureaucratic process, but also a communication process through which target groups understand, accept, and respond to policy rules. Farmers’ limited understanding of LP2B shows that policy knowledge remains concentrated within government institutions, while the affected community often receives only partial or practical information. This condition supports previous studies which found that weak socialization and limited public participation reduce the effectiveness of agricultural land protection policies (Sharma et al., 2022; Dogaru et al., 2024). However, the Karawang case adds a more specific insight: the problem is not merely lack of participation, but the absence of meaningful policy translation from legal language into farmer-oriented information. In practical terms, rice field

protection will remain fragile if farmers know the zoning terms but do not understand the rights, restrictions, incentives, and long-term implications of LP2B.

The third finding concerns institutional coordination, which appears formally established but not yet operationally integrated. Agencies responsible for agriculture, spatial planning, licensing, enforcement, and regional development have their respective mandates, yet fragmented data, uneven monitoring, and reactive supervision weaken the consistency of implementation. This finding refines the “appropriate environment” and “appropriate process” dimensions by showing that the presence of many institutions does not necessarily produce effective governance. What matters is not only whether institutions are involved, but whether they share data, coordinate inspections, and respond collectively to land-use violations. This is in line with land governance literature which argues that policy failure often occurs when institutional responsibilities are divided without adequate coordination mechanisms (Boufounou et al., 2024; Su et al., 2024). An alternative explanation is that coordination becomes difficult because rice field conversion is not handled solely as an agricultural issue, but intersects with licensing, housing, investment, infrastructure, and spatial planning. Thus, this study extends the implementation framework by showing that institutional environment must be assessed through the quality of inter-agency integration, not merely through formal role distribution.

The fourth finding demonstrates that compensation adequacy is not a secondary support factor, but a core condition for policy legitimacy. Farmers are expected to maintain paddy fields for the broader interest of food security, yet they also face production costs, uncertain prices, limited access to inputs, and strong pressure from rising land values. This creates a structural imbalance: the public benefits of land protection are widely shared, but the economic burden is largely borne by farmers. Previous studies have shown that unclear or insufficient incentives weaken the sustainability of agricultural land protection policies (Faoziyah et al., 2024; Kholik et al., 2024). The present study goes further by showing that compensation functions as a governance mechanism that shapes farmer acceptance and compliance. If compensation is limited to tax relief or partial input support, it may not be strong enough to offset the economic attraction of land conversion. Therefore, compensation adequacy should be positioned as an extension of the policy effectiveness framework because it connects legal protection with social justice, farmer welfare, and long-term policy sustainability.

The fifth finding highlights policy synchronization as a decisive factor in controlling rice field conversion in rapidly industrializing regions. Karawang cannot be governed only through agricultural protection policy because its land-use dynamics are also shaped by industrial estates, housing expansion, infrastructure development, and investment policy. When these sectors are not aligned, rice field protection becomes vulnerable to indirect pressure from non-agricultural development. This finding supports recent arguments that food security governance requires policy coherence across sectors rather than isolated agricultural regulation (Gu et al., 2024; Kayes et al., 2026). More importantly, the study modifies the existing implementation effectiveness framework by positioning policy synchronization as a distinct dimension, not merely as part of institutional coordination. The implication is that agriculture and industry should not be treated as competing policy agendas; instead, they need to be integrated through a regional development strategy that protects productive land while increasing agricultural value added. For other rapidly industrializing agricultural regions in Southeast Asia, the Karawang case offers a broader lesson: food security policy will remain weak if it is not synchronized with the economic forces that reshape land use. Taken together, the findings suggest that effective rice field conversion control requires legal protection, implementation capacity, farmer-oriented compensation, and cross-sector policy coherence as an integrated governance system.

CONCLUSION

This study shows that rice field conversion control policy in Karawang Regency has been institutionally established but remains only partially effective in practice. The policy is relevant to the protection of productive paddy fields and to the broader agenda of national food security; however, its effectiveness is weakened by limited public understanding, uneven implementation, weak field supervision, incomplete target achievement, inadequate farmer support, and insufficient

alignment with industrial and spatial development policies. These findings indicate that land conversion control cannot rely solely on formal regulation, zoning, or legal designation. Policy effectiveness depends on the ability of local government to translate formal rules into operational control, community understanding, institutional coordination, and practical support for farmers.

The main contribution of this study lies in extending the policy implementation effectiveness framework by positioning compensation adequacy and policy synchronization as central dimensions of land-use governance. Compensation is not merely an incentive but a mechanism of policy legitimacy because farmers are expected to protect land that produces benefits for wider food security. Policy synchronization is equally important because rice field protection will remain vulnerable if agricultural policy is not aligned with industrial growth, housing development, investment planning, and spatial governance. Practically, the Karawang Regency Government needs to strengthen LP2B socialization, integrate inter-agency monitoring, improve farmer support schemes, and develop an agro-industrial strategy that protects productive land while increasing agricultural value added. Because this study focuses on a single strategic case, future research should compare Karawang with other industrializing agricultural regions to assess whether the expanded framework is applicable across different land-use governance contexts.

AUTHOR CONTRIBUTIONS STATEMENT

Fahmi Ardiansyah conceived the research idea, designed the study, conducted the field investigation, collected and analyzed the data, interpreted the findings, and prepared the original manuscript draft. Muhadam Labolo contributed to the conceptualization of the study, supervised the research process, critically reviewed the theoretical framework, and provided substantial revisions to strengthen the policy analysis and academic content. Tjahjo Suprajogo contributed to the research methodology, validated the analytical framework, assisted in interpreting the empirical findings, and reviewed the manuscript for intellectual content and methodological consistency. Eko Budi Santoso contributed to the interpretation of the results, refined the discussion and policy implications, critically reviewed the manuscript, and approved the final version for publication.

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