Jurnal Ilmu Administrasi
Media Pengembangan Ilmu dan Praktek Administrasi
Volume 23 | Number 1 | June 2026

Vol. 23 No.1
pp 47-70 © 2026
ISSN 1829 - 8974
e-ISSN 2614-2597

Institutional Dynamics in Sustainable Food Crop Land Protection (LP2B) Implementation in Bandung Regency, Indonesia

[1] Muhammad Andi Septiadi, [2] Siti Alia, [3] Rudi Kresna
[1] *Universitas Islam Negeri Sunan Gunung Djati Bandung, West Java, Indonesia*
[2] *Universitas Islam Negeri Sunan Gunung Djati Bandung, West Java, Indonesia*
[3] *Regional Agency for Development Planning, Research, and Innovation of Bandung Regency, West Java Indonesia*
[1] septiadi.andi90@uinsgd.ac.id,[2] aliaalya267@uinsgd.ac.id, [3] rudi.kresna77@gmail.com

ARTICLE INFORMATION

Article history :
Submit:
20-04-2025
First Revision:
04-06-2026
Accepted:
25-06-2026

Keywords *:*
LP2B, paddy field conversion, institutional governance, peri-urban agriculture.

ABSTRACT

The rapid conversion of paddy fields in Bandung Regency, Indonesia, threatens regional food security and challenges the implementation of the Sustainable Food Crop Land Protection (LP2B) policy. This study examines the institutional dynamics influencing LP2B implementation using the Institutional Analysis and Development (IAD) framework. A descriptive qualitative approach was employed through document analysis, in-depth interviews with ten key informants, two focus group discussions (FGDs), and field observations conducted in five purposively selected villages: Sugihmukti, Jelegong, Bojongsari, Sumbersari, and Banjaran Wetan. Data were analyzed using the interactive model of Miles and Huberman. The findings reveal distinct institutional dynamics across the five villages. Jelegong and Bojongsari experience stronger land conversion pressure driven by urbanization and land market expansion, whereas Sumbersari and Banjaran Wetan face greater challenges related to irrigation limitations. Sugihmukti demonstrates relatively stronger community participation in farmland management but remains vulnerable to market-driven land conversion. LP2B implementation is constrained by weak inter-agency coordination, limited village administrative capacity, inadequate policy dissemination, ineffective incentive mechanisms, and insufficient irrigation infrastructure. Conversely, active farmer groups, village regulations, and local government initiatives provide institutional opportunities to strengthen farmland protection. The study highlights that effective LP2B implementation depends not only on formal regulations but also on the interaction between institutional capacity, local governance, and stakeholder collaboration. These findings contribute to the literature on agricultural land governance by demonstrating how institutional dynamics shape the implementation of farmland protection policies in peri-urban regions.

A. INTRODUCTION

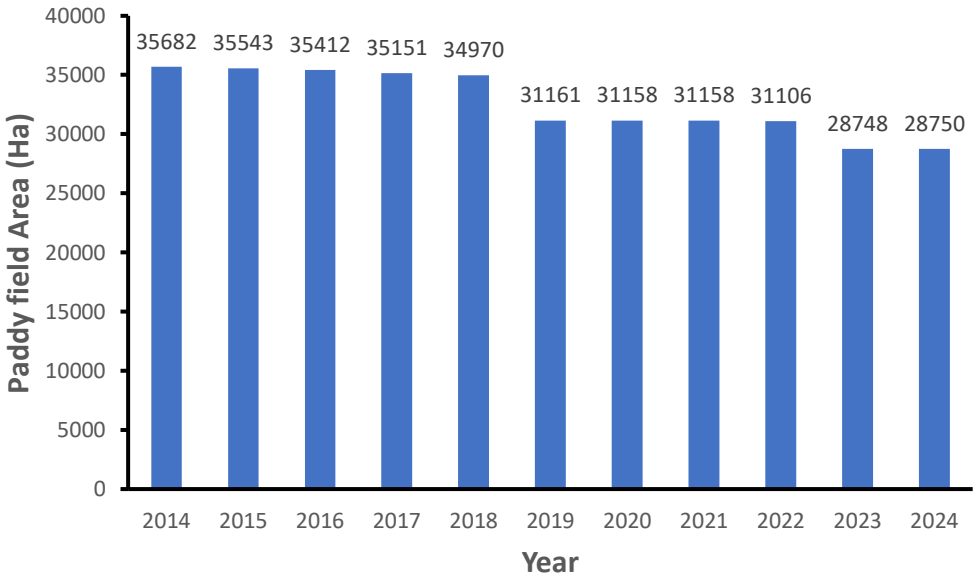
Food security is a national strategic issue that continues to receive attention from both the central and regional governments (Akbari et al., 2022). From a sustainable development perspective, a region's

ability to meet its population's food needs is a key indicator of successful natural resource management and regional development (Ghosh et al., 2024). However, efforts to achieve food security face serious challenges, primarily due to the increasing conversion of agricultural land, particularly rice paddies, which play a crucial role as a primary source of food production.

Nationally, Indonesia's cultivated rice paddy area was recorded at approximately 7.46 million hectares, showing a declining trend over time due to the conversion of agricultural land into non-agricultural uses such as settlements, infrastructure, and industry (Kementerian Pertanian Republik Indonesia, 2021; Panjaitan et al., 2026). A similar trend is also observed in West Java Province. According to a study by the Center for Agrarian and Spatial Planning Research and Development/National Land Agency, the area of cultivated rice paddies in West Java decreased by 4.04% from 936,529 hectares to 898,711 hectares between 2014 and 2018 (Badan Pangan Nasional, 2025).

As one of the food buffer zones in West Java, Bandung Regency is also experiencing similar pressures. With an area of approximately 176,238.67 hectares, Bandung Regency is facing a significant decline in rice paddy area. Data from the Bandung Regency Agriculture Office shows that between 2014 and 2024, rice paddy area decreased by 19.43%, from approximately 35,682 hectares to 28,750 hectares. This situation indicates that the conversion of rice paddy land in Bandung Regency is a serious problem and requires stronger policy attention to maintain the sustainability of regional food security.

Graph. 1 Paddy field area in Bandung Regency, 2014–2024



Source: Bandung Regency Agriculture Office (2024).

Graph 1 shows that the paddy field area in Bandung Regency continuously declined during the 2014–2024 period, primarily due to the conversion of agricultural land to non-agricultural uses. Over this period, the total paddy field area decreased by 6,932 ha. Official records from the Bandung Regency Agriculture Office indicate that the most substantial annual decline occurred between 2018 and 2019, when the paddy field area decreased from 34,970 ha to 31,161 ha, representing a reduction of approximately 3,809 ha. These data were verified using official data from the Bandung Regency Agriculture Office and represent the largest annual decrease recorded during the study period.

Previous studies have shown that the implementation of agricultural land protection policies is often hampered by weak inter-agency coordination, limited local government capacity, and high economic pressure on landowners. Furthermore, top-down policy approaches have not fully accommodated local dynamics and the interests of village-level actors. In the context of Bandung Regency, this indicates a gap between formal policy design and its implementation in practice, characterized by persistently high rates of land conversion, weak oversight, and suboptimal policy incentive instruments (Gafuraningtyas et al., 2024; Li et al., 2024; Mertina et al., 2025; Purba et al., 2025; Saifuddin et al., 2024).

Although numerous studies have examined land conversion and agricultural policy, much of the existing literature has focused on spatial patterns, economic drivers, or broad policy evaluation. Less attention has been given to the institutional dynamics and actor interactions that shape the local implementation of Sustainable Food Crop Land Protection Policy, known as LP2B. This gap is important because the effectiveness of land protection policy depends not only on formal regulatory design, but also on how actors interpret rules, negotiate interests, and respond to social and economic pressures during implementation.

To address this gap, this study applies the Institutional Analysis and Development (IAD) framework to examine how external conditions, action arenas, actor interactions, and institutional arrangements influence policy outcomes. The framework is particularly relevant because it enables the analysis of how formal and informal rules, local administrative capacity, economic incentives, and stakeholder interests shape the implementation of LP2B at the village level. Rather than merely assessing whether the policy has succeeded or failed, this study identifies the institutional mechanisms that constrain or support effective paddy field protection.

This study advances the existing literature by demonstrating that the limited effectiveness of LP2B implementation is not merely an administrative or implementation failure, but reflects a policy design gap arising from the misalignment between formal institutional rules and local socio-economic realities. While the IAD framework has been widely applied to explain how institutional arrangements shape policy outcomes, its application to agricultural land protection has primarily emphasized institutional components rather than how policy design interacts with local governance capacity and economic pressures. This study argues that, in peri-urban agricultural areas, policy effectiveness depends not only on formal regulations but also on the alignment between policy design, land market pressure, village administrative capacity, land tenure arrangements, and the credibility of policy incentives.

Unlike previous studies that have primarily focused on spatial patterns of land conversion, economic drivers, or general policy evaluation, this study explains how LP2B is implemented through the interaction of actors, institutional rules, and governance processes within local action arenas. By examining the relationships among farmers, landowners, village governments, regional agencies, and other stakeholders, this study provides a more comprehensive institutional explanation of why paddy field protection policies often fail to achieve their intended outcomes. Therefore, this study contributes theoretically by extending the application of the IAD framework to peri-urban agricultural land governance, demonstrating that the effectiveness of farmland protection depends not only on institutional rules but also on the extent to which policy design aligns with local economic incentives, administrative capacity, and inter-organizational coordination.

B. METHOD

This study uses a descriptive qualitative approach to analyze the implementation of the Sustainable Food Crop Land Protection (LP2B) policy in controlling paddy field conversion in Bandung Regency. This approach was chosen because it enables an in-depth understanding of policy implementation dynamics, actor interactions, and institutional factors influencing paddy field protection at the local level (Creswell, 2016). The analysis is guided by the Institutional Analysis and Development (IAD) framework developed by Elinor Ostrom (2011), which is used to examine the relationships among external variables, rules-in-use, action arenas, actor interactions, and policy outcomes.

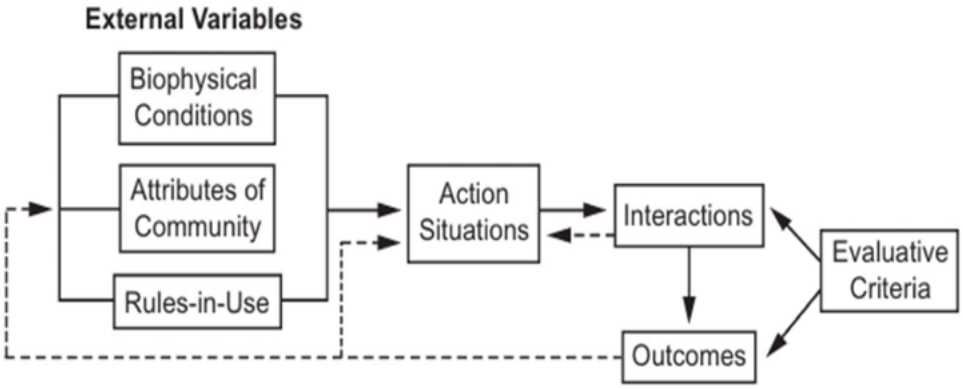


Figure 1. Institutional Analysis and Development (IAD) Framework
Source: Adapted from Ostrom (2011).

As illustrated in Figure 1, the Institutional Analysis and Development (IAD) framework provides the analytical basis for examining the implementation of the Sustainable Food Crop Land Protection (LP2B) policy in Bandung Regency. The framework was selected because LP2B implementation involves multiple actors operating under different institutional arrangements, formal regulations, and local socio-economic conditions. The IAD framework enables a systematic analysis of how external variables—including biophysical conditions, community attributes, and rules-in-use—influence the action situation in which farmers, landowners, village governments, and government agencies interact. These interactions subsequently shape policy outcomes related to paddy field protection and land conversion control. Therefore, the IAD framework is particularly suitable for this study because it explains how institutional arrangements, actor interactions, and external conditions collectively influence the implementation outcomes of LP2B, rather than viewing policy implementation solely as an administrative process.

The research locations were purposively determined in five villages selected based on varying levels of land conversion, development pressure, and the availability of local land protection instruments. The five villages were Sugihmukti in Pasirjambu District, Jelegong in Kutawaringin District, Bojongsari in Bojongsoang District, Sumbersari in Ciparay District, and Banjaran Wetan in Banjaran District. Sugihmukti Village was selected because it faces pressure from agro-tourism development and land conversion. Jelegong Village was selected because it is located in an agricultural-industrial transition zone and faces infrastructure development pressure. Sumbersari Village was selected because it is a strategic area facing residential growth and already has village regulations related to paddy field protection. Bojongsari Village was selected because it faces development pressure in lowland areas near rivers while also having village-level land protection regulations. Banjaran Wetan Village was selected as a comparison site because its land conditions are relatively stable and it has the potential to serve as a model for paddy field protection. These different village characteristics allow the study to capture varied institutional and spatial dynamics in LP2B implementation.

Research data were obtained through document analysis, in-depth interviews, focus group discussions (FGDs), and field observations. Document analysis was conducted by examining relevant regulations, spatial planning documents, protected paddy field data, and LP2B policy implementation reports. In-depth interviews were conducted using purposive sampling with ten key informants, consisting of two representatives from ATR/BPN, one representative from Bappeda/Baperida, two representatives from the Bandung Regency Agriculture Office, and five farmer group representatives from the selected villages.

The informants were purposively selected because they represented the principal actors involved in LP2B implementation at different institutional levels. Representatives from ATR/BPN were selected due to their responsibility for land administration and spatial information management, while Bappeda/Baperida was included because of its role in regional development planning and inter-agency policy coordination. Representatives from the Bandung Regency Agriculture Office were selected because they are directly responsible for implementing agricultural land protection programs and providing technical support to farmers. Farmer group representatives were selected because they are the primary policy beneficiaries and directly experience the impacts of land conversion and LP2B

implementation at the village level. This composition enabled the study to capture multiple institutional perspectives consistent with the action arena concept of the IAD framework.

This study also conducted two FGDs at Baperida Kabupaten Bandung involving representatives from the Agriculture Office, ATR/BPN, Bappeda/Baperida, the Public Works Office (PU), the Environmental Agency (DLH), farmer groups, and other relevant stakeholders. The first FGD was conducted at the initial stage of the research to identify key implementation problems, institutional constraints, and stakeholder perspectives regarding LP2B implementation. The second FGD was conducted after the preliminary analysis to present, validate, and discuss the research findings, allowing participants to provide feedback and confirm the interpretation of the results. Field observations were carried out in the five selected villages to examine paddy field conditions, land-use change, irrigation constraints, and local institutional practices related to farmland protection.

Data analysis followed the interactive model of Miles and Huberman (2014), consisting of data reduction, data display, and conclusion drawing. Interview and FGD data were coded according to the main components of the IAD framework, including external variables, rules-in-use, action arenas, actor interactions, and policy outcomes, before being synthesized into broader institutional themes. Data reduction was conducted by selecting and organizing relevant information, while data display was used to compare findings across villages and institutional settings. Conclusion drawing was undertaken by interpreting patterns of policy design gaps, actor rationality, institutional constraints, and implementation outcomes. To ensure the credibility of the findings, this study employed source and technique triangulation by comparing evidence obtained from document analysis, interviews, FGDs, field observations, and spatial data.

C. RESEARCH FINDING AND DISCUSSION

General Overview of Research Results

Research findings indicate that the implementation of the Sustainable Food Crop Land Protection (LP2B) policy in Bandung Regency has not been implemented evenly across the five study villages: Sugihmukti, Jelegong, Bojongsari, Sumbersari, and Banjaran Wetan. Although LP2B has been formally established as the principal policy instrument for protecting agricultural land, its implementation at the village level remains constrained by land conversion pressure, weak inter-agency coordination, limited irrigation infrastructure, uneven policy dissemination, and differences in local agrarian structures. These institutional and biophysical differences result in varying implementation outcomes among the five villages.

To facilitate a systematic comparison, all villages are analyzed using the same analytical dimensions derived from the Institutional Analysis and Development (IAD) framework, namely: (1) Protected Paddy Fields (LSD), (2) Standard Paddy Fieldss (LBS), (3) land-use change and paddy field conversion, (4) irrigation conditions and agricultural productivity, (5) land tenure arrangements, (6) policy dissemination and village institutional support, and (7) the main implementation issues affecting LP2B. Applying the same analytical dimensions enables a consistent comparison of institutional dynamics across villages despite differences in their local characteristics.

The comparative analysis demonstrates distinct implementation patterns among the five villages. Jelegong and Bojongsari experience stronger pressure from urbanization, industrial expansion, infrastructure development, and increasing land values, resulting in greater risks of paddy field conversion. In contrast, Sumbersari and Banjaran Wetan are more strongly affected by irrigation constraints, which reduce agricultural productivity and encourage farmers to modify cropping patterns. Sugihmukti remains relatively productive because of favorable irrigation conditions, although gradual land conversion and land fragmentation continue to occur. Across all villages, differences in LP2B implementation are influenced not only by biophysical conditions but also by institutional capacity, policy dissemination, farmer participation, land tenure arrangements, and the availability of technical support from the district government.

These findings indicate that LP2B implementation is highly context-dependent. The effectiveness of farmland protection varies according to the interaction between local institutional capacity, agrarian structures, biophysical conditions, and development pressure, demonstrating that a uniform policy approach is insufficient for addressing the diverse implementation challenges across villages.

To provide a consistent basis for comparison, the implementation of LP2B across the five study villages was assessed using the same analytical dimensions. These dimensions were derived from the

Institutional Analysis and Development (IAD) framework and summarize the principal institutional and biophysical characteristics identified during the field study. As shown in Table 1, the comparison highlights substantial variation in land protection status, land-use change, irrigation conditions, land tenure arrangements, and institutional capacity across villages.

Table 1. Comparative Dimensions of LP2B Implementation Across the Five Study Villages

Village	Main Pressure	Key Institutional Issue	Main Agricultural Constraint	Main LP2B Implementation Issue
Sugihmukti	Agro-tourism development and gradual land fragmentation	Limited operational incentive mechanisms	Irrigation needs and agricultural machinery renewal	Productive paddy fields remain vulnerable to conversion pressure
Jelegong	Industrial transition, infrastructure development, and land market pressure	Inconsistency between administrative LSD status and spatial map data	Limited irrigation water	Data synchronization and policy credibility problems
Bojongsari	Residential and infrastructure development	Village regulations exist but incentives remain weak	Limited irrigation and declining number of farmers	Local regulation is not fully supported by operational incentives
Sumbersari	Residential growth and commodity shifting	Limited landowner involvement and village administrative capacity	Dry-season irrigation constraints	Farmers adapt through crop diversification, but institutional support remains limited
Banjaran Wetan	Gradual conversion near road-accessible areas	Uneven LP2B dissemination	Limited irrigation and one rice harvest per year	Low conversion pressure, but weak institutional intervention

Table 1 shows that LP2B implementation differs considerably across the five villages. Jelegong and Bojongsari are primarily influenced by urbanization and infrastructure expansion, whereas Sumbersari and Banjaran Wetan are more constrained by irrigation limitations. Sugihmukti remains relatively productive but continues to experience gradual land conversion pressure. These differences demonstrate that LP2B implementation is strongly influenced by local institutional and biophysical conditions, supporting the subsequent village-level analysis.

Sugihmukti Village, Pasirjambu District

Based on field observations and official spatial data from the Bandung Regency Agriculture Office, Sugihmukti Village contains approximately 145.36 ha of Protected Paddy Fields (LSD) and is located within Pasirjambu District, which has a total of 730.47 ha of LSD. Official records further indicate that Pasirjambu District experienced a reduction of approximately 198 ha of paddy fields during the 2018–2019 period due to conversion to residential areas and high-value horticultural commodities. Although Sugihmukti is located within this broader area of land conversion pressure, field observations indicate that its remaining paddy fields are still relatively productive because of favorable rainfall and irrigation conditions. Nevertheless, interviews reveal that LP2B implementation remains constrained by limited irrigation development, the need for agricultural machinery renewal, and the absence of clear operational regulations governing incentive mechanisms for protected paddy fields.

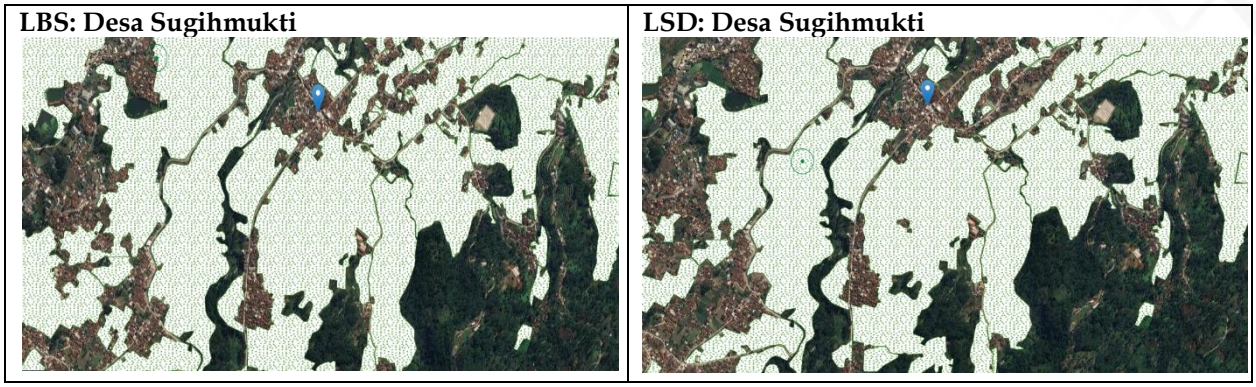


Figure 2. Map of Standard Paddy Fieldss (LBS) and Protected Paddy Fields (LSD) in Sugihmukti Village, Pasirjambu District, Bandung Regency, accessed through the West Java Wargi Map in 2025.

Source: Processed by researchers from the West Java Wargi Map (https://wargi.jabarprov.go.id/petav2/), 2025.

Figure 3. Map of Sugihmukti Village viewed through Google Earth Pro with the latest imagery from 2025 to illustrate the actual conditions and Map of Sugihmukti Village viewed through Google Earth Pro with 2010 imagery to illustrate conditions during that period.

Source: Processed by researchers from Google Earth Pro (2025) and Google Earth Pro (2010 imagery).

Based on Figure 2, a comparison of the Standard Paddy Fields (LBS) and Protected Paddy Field (LSD) maps in Sugihmukti Village shows that paddy fields still dominate, but are beginning to experience fragmentation due to pressure from non-agricultural land uses. The distribution pattern of paddy fields is no longer intact because they have been separated by settlements and road networks. In Figure 3, a satellite image from 2025 shows the actual condition of the village with an increase in residential areas scattered among agricultural land. This indicates a gradual and fragmented change in land use. Meanwhile, Figure 3, which shows conditions in 2010, shows that paddy fields during that period were still wider and more integrated than conditions in 2025. A comparison of these three images shows that in a period of about a decade there has been a significant spatial transformation, so that the protection of paddy fields in Sugihmukti Village spatially still faces quite serious pressure from land conversion.

The findings from Sugihmukti Village indicate that land conversion is driven not only by declining agricultural productivity but also by institutional limitations in sustaining farmers' incentives to retain protected agricultural land. Although relatively stable rainfall and irrigation conditions enable rice cultivation to remain productive, the gradual fragmentation of paddy fields demonstrates that productive agricultural land is still vulnerable to conversion when policy support mechanisms are incomplete. The absence of operational regulations governing incentive schemes, together with limited irrigation improvement and the slow renewal of agricultural machinery, reduces the capacity of LP2B to influence farmers' long-term land-use decisions. From the perspective of the Institutional Analysis and Development (IAD) framework, these findings suggest that policy outcomes are shaped by the

interaction between favourable biophysical conditions and institutional arrangements that have not yet provided sufficient economic and technical incentives for sustained farmland protection.

Jelegong Village, Kutawaringin District

Based on field observations and official spatial data from the Bandung Regency Agriculture Office, Jelegong Village is located within Kutawaringin District, which experienced a reduction of approximately 390 ha of paddy fields during the 2018–2019 period and a cumulative decline of approximately 479 ha between 2014 and 2024. These figures indicate that the village is situated within an area experiencing substantial land conversion pressure. Interviews with the Agricultural Extension Center (BPP), however, indicate that Jelegong Village is currently not classified as Protected Paddy Fields (LSD). In contrast, spatial observations using the 2025 West Java Wargi Map still identify several paddy field parcels within the village as LSD. Rather than representing a simple data inconsistency, this discrepancy suggests incomplete synchronization between agricultural administration, spatial information systems, and LP2B implementation. Such inconsistencies may create uncertainty regarding the legal protection status of agricultural land and reduce the effectiveness of land conversion control. Field observations further indicate that agricultural activities are still ongoing, although productivity is constrained by limited irrigation water, leading many farmers to shift toward secondary crops. Interviews also reveal that land ownership is largely controlled by absentee landowners, while many local residents increasingly depend on non-agricultural employment. These conditions indicate that LP2B implementation in Jelegong Village is constrained not only by biophysical limitations but also by institutional coordination, land information management, policy dissemination, and agricultural infrastructure.

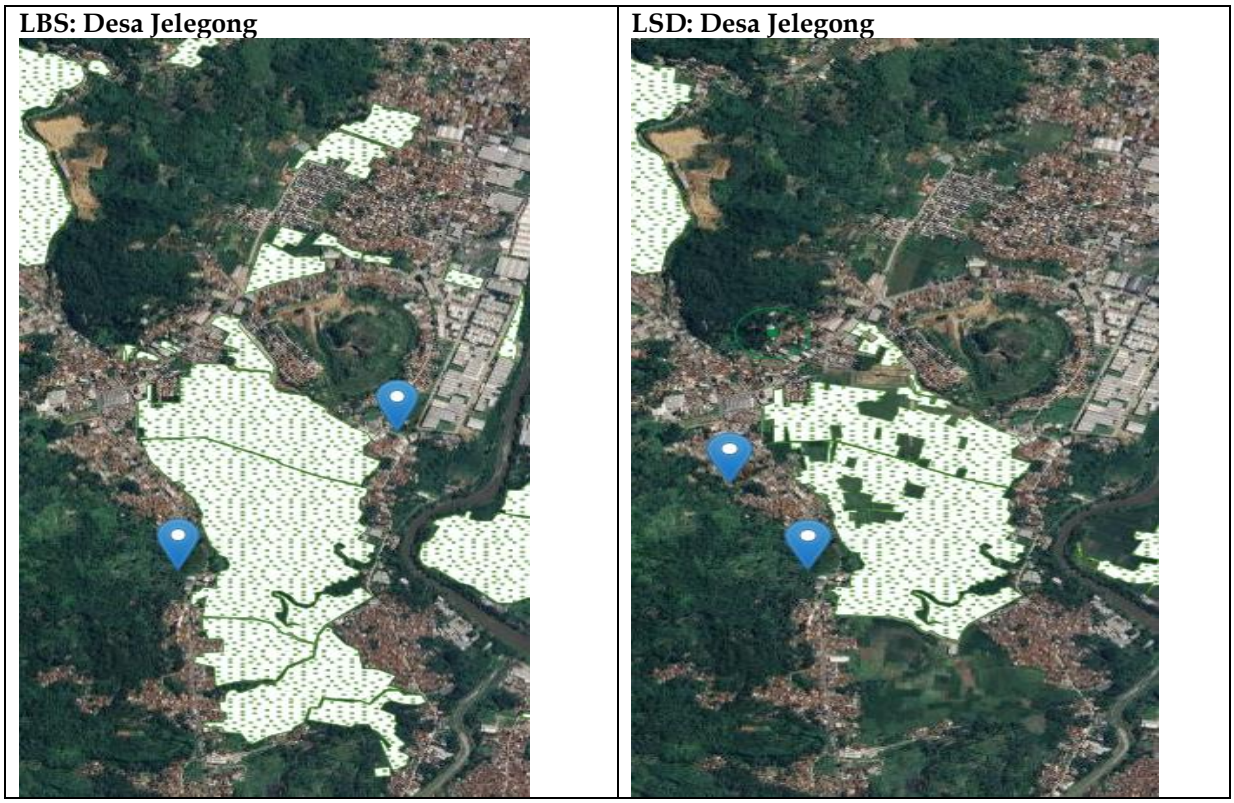


Figure 4. Map of Standard Paddy Fieldss (LBS) and Protected Paddy Fields (LSD) in Jelegong Village, Kutawaringin District, Bandung Regency, accessed through the West Java Wargi Map in 2025.

Source: Processed by researchers from the West Java Wargi Map (https://wargi.jabarprov.go.id/petav2/), 2025.

Figure 5. Map of Jelegong Village viewed through Google Earth Pro with the most recent imagery from 2025 to depict actual conditions, and a map of Jelegong viewed through Google Earth Pro with imagery from 2010 to depict conditions during that period.

Source: Processed by researchers from Google Earth Pro (2025) and Google Earth Pro (2010 imagery).

Based on Figure 4, the LBS and LSD maps show that paddy fields in Jelegong Village are scattered across several areas and no longer form a complete expanse, as they are adjacent to built-up areas. Figure 5 shows a satellite image from 2025, where residential areas, road networks, and non-agricultural areas appear more dominant, while agricultural land remains in a fragmented pattern. Figure 5 shows conditions in 2010, when agricultural land was still relatively larger and integrated, with built-up areas that were not as dense as in 2025. A comparison of these three images shows that Jelegong Village has experienced quite significant changes in land use and increasing pressure for regional development.

These findings indicate that the implementation of LP2B in Jelegong Village is constrained not only by the rapid conversion of agricultural land but also by institutional inconsistencies in policy implementation. The discrepancy between administrative records and field observations regarding the status of Protected Paddy Fields (LSD) reflects weaknesses in inter-agency coordination and land information management, reducing the effectiveness and credibility of policy implementation. Furthermore, the limited availability of irrigation water, the increasing dependence on non-agricultural employment, and the predominance of absentee land ownership have weakened farmers' incentives to maintain agricultural land. From the perspective of the Institutional Analysis and Development (IAD) framework, these findings demonstrate that policy outcomes are shaped by the interaction between institutional arrangements, biophysical conditions, and socio-economic incentives within the local action arena. Consequently, formal regulations alone are insufficient to control paddy field conversion without stronger institutional coordination, reliable land information systems, and policy instruments that respond to local economic conditions.

Bojongsari Village, Bojongsoang District

Based on policy documentation, interviews, and field observations, Bojongsari Village represents one of the pioneering villages in LP2B implementation in Bandung Regency. The village has approximately 510 ha of agricultural land, including 310 ha of paddy fields, around 280 ha designated under LP2B, and 185.6 ha classified as Protected Paddy Fields (LSD). This protection has been strengthened through village regulations issued during the 2020–2021 period. Compared with other study villages, Bojongsari demonstrates relatively stronger village-level institutional support for paddy field protection. Field observations indicate that agricultural activities remain productive, with an average rice yield of approximately 7 tons per hectare and relatively intensive cropping patterns. However, interviews reveal that fiscal incentives for LSD land, particularly Land and Building Tax reductions, have not been implemented optimally because of unclear land administration and the absence of fully operational incentive mechanisms. The village also continues to face pressure from

regional development, limited irrigation infrastructure, a declining number of farmers, and the need for stronger policy dissemination, infrastructure support, and spatial utilization control. These findings indicate that Bojongsari has relatively advanced local institutional arrangements, but their effectiveness remains dependent on district-level administrative support, clear incentive mechanisms, and stronger coordination in controlling land-use change.

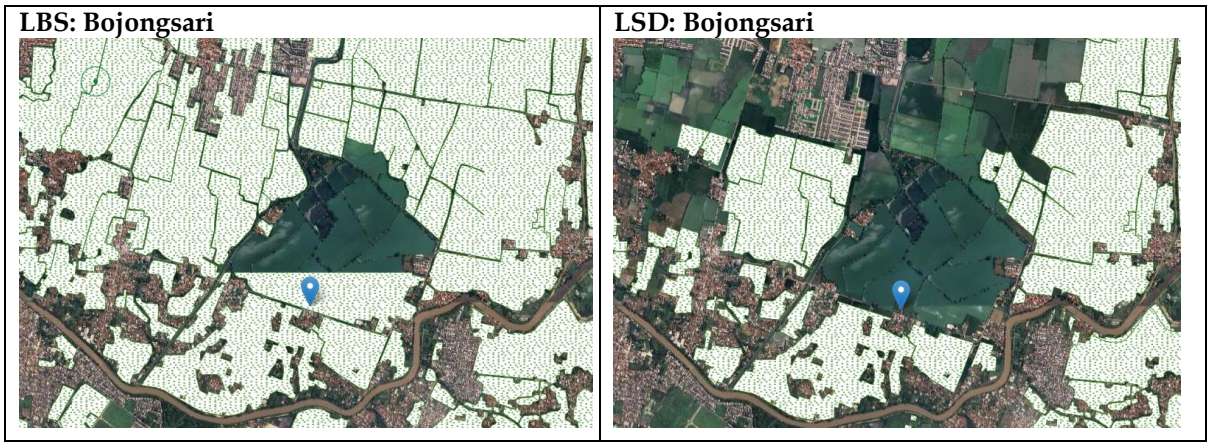


Figure 6. Map of Standard Paddy Fieldss (LBS) and Protected Paddy Fields (LSD) in Bojongsari Village, Bojongsoang District, Bandung Regency, accessed through the West Java Wargi Map in 2025.

Source: Processed by researchers from the West Java Wargi Map (https://wargi.jabarprov.go.id/petav2/), 2025.

Figure 7. Map of Bojongsari Village viewed through Google Earth Pro with the most recent imagery from 2025 to depict actual conditions, and a map of Bojongsari Village viewed through Google Earth Pro with imagery from 2010 to depict conditions during that period.

Source: Processed by researchers from Google Earth Pro (2025) and Google Earth Pro (2010 imagery).

Based on Figure 6, a comparison of the maps of Standard Paddy Fields (LBS) and Protected Paddy Fields (LSD) shows that the paddy fields in Bojongsari Village still form a relatively large and integrated expanse. The LSD area also covers most of the paddy fields, although some parts directly border settlements and road networks. Figure 7 shows a satellite image from 2025 which shows that agricultural land still dominates the area, but the development of residential areas is starting to be seen in several points, especially along the main road. Meanwhile, Figure 7, which shows conditions in 2010, shows that agricultural land during that period was wider and more integrated, with built-up areas still limited. A comparison of these three images shows that Bojongsari Village still maintains its dominant agricultural function, although settlement development is occurring gradually and needs to be controlled.

Unlike the other study villages, Bojongsari demonstrates that stronger village-level institutional arrangements can contribute to better agricultural land protection. The existence of village regulations supporting LP2B and relatively high agricultural productivity has helped maintain the dominance of agricultural land despite increasing development pressure. Nevertheless, the limited implementation of fiscal incentives, particularly those related to land tax exemptions, indicates that institutional commitments have not yet been fully supported by operational policy instruments. From the IAD perspective, this suggests that formal rules established at the village level are capable of influencing actors' behaviour, but their effectiveness depends on complementary incentive mechanisms and administrative capacity. Therefore, Bojongsari illustrates that local institutional innovation alone is insufficient without consistent support from district-level policies and implementation mechanisms.

Sumbersari Village, Ciparay District

Based on official documentation, field observations, and spatial data from the Bandung Regency Agriculture Office, Sumbersari Village contains approximately 657.83 ha of Protected Paddy Fields (LSD) and is located within Ciparay District. Official records indicate that Ciparay District experienced a reduction of approximately 293 ha of paddy fields during the 2018–2019 period and a cumulative decline of approximately 380 ha between 2014 and 2024. These figures indicate that Sumbersari Village is situated within a district experiencing continuous pressure from paddy field conversion. Despite this trend, field observations show that agricultural activities remain active, although productivity is constrained by limited irrigation water, particularly during the dry season. Interviews reveal that many farmers have adapted by shifting part of their cultivation from rice to more drought-tolerant commodities, including shallots, maize, tobacco, and biopharmaceutical crops. Local adaptation measures have also been implemented through the construction of shallow and deep wells, the provision of seeds, fertilizers, and agricultural machinery, and the adoption of synchronized planting systems that allow two to three planting seasons annually in suitable areas. Nevertheless, interviews indicate that LP2B implementation remains constrained by limited policy dissemination, insufficient involvement of landowners and farmer groups, and the limited administrative capacity of the village government to develop and implement technical regulations supporting farmland protection. These findings suggest that while farmers have demonstrated considerable adaptive capacity in responding to environmental constraints, institutional support for LP2B implementation has not yet kept pace with the challenges posed by continued land conversion and water scarcity.

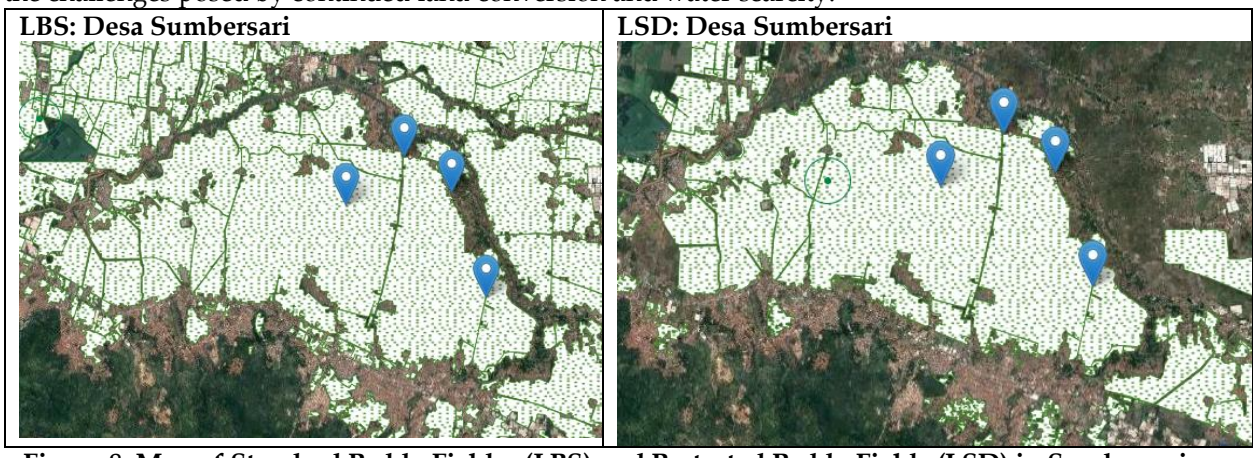


Figure 8. Map of Standard Paddy Fieldss (LBS) and Protected Paddy Fields (LSD) in Sumbersari Village, Ciparay District, Bandung Regency, accessed through the West Java Wargi Map in 2025.
Source: Processed by researchers from the West Java Wargi Map (https://wargi.jabarprov.go.id/petav2/), 2025.

Figure 9. Map of Sumbersari Village viewed through Google Earth Pro with the most recent imagery from 2025 to depict actual conditions, and a map of Sumbersari Village viewed through Google Earth Pro with imagery from 2010 to depict conditions during that period.
Source: Processed by researchers using Google Earth Pro (2025) and Google Earth Pro (2010 imagery).

Based on Figure 8, the map of Standard Paddy Fields (LBS) and Protected Paddy Fields (LSD) shows that Sumbersari Village still has extensive and relatively integrated paddy fields, with the LSD area covering most of the agricultural area. Figure 9 shows a satellite image from 2025 which shows that agricultural land still dominates, although residential areas have begun to develop along roads and activity centers. Meanwhile, Figure 9, which shows conditions in 2010, shows wider and more integrated agricultural land, with still limited built-up areas. A comparison of the three images shows that Sumbersari Village still maintains its dominant agricultural function, although the gradual development of settlements requires more balanced management to maintain the sustainability of the paddy fields.

The findings from Sumbersari Village demonstrate that the effectiveness of LP2B implementation is strongly influenced by the interaction between biophysical constraints and institutional capacity. Although farmers have adapted to limited irrigation through crop diversification, groundwater utilization, and improvements in agricultural technology, these adaptive strategies have not been accompanied by equally strong institutional support. Limited policy dissemination, insufficient involvement of landowners, and the relatively weak capacity of village institutions to develop supporting regulations reduce the effectiveness of agricultural land protection. Within the IAD framework, these findings indicate that successful policy implementation depends not only on farmers' adaptive capacity but also on institutional arrangements that facilitate collective action, stakeholder participation, and sustained policy support.

Banjaran Wetan Village, Banjaran District

Based on official documentation, field observations, and interviews, Banjaran Wetan Village is located within Banjaran District, which shows relatively controlled land conversion dynamics compared with several other study areas. Official data from the Bandung Regency Agriculture Office indicate that Banjaran District recorded an increase of approximately 12 ha of paddy fields during the 2018–2019 period, followed by a cumulative decline of approximately 73 ha between 2014 and 2024. Banjaran Wetan Village is characterized by paddy fields distributed along valley areas, so they do not form a single large agricultural expanse but still function as local food production areas. Interviews and observations show that agricultural activities remain dominated by rice, followed by sweet potatoes and sweet corn, with most rice production used for household consumption. However, limited irrigation water remains a major constraint, leading many farmers to harvest rice only once a year before shifting to secondary crops. Land conversion to housing is still relatively limited and generally occurs near road-accessible areas. At the institutional level, LP2B dissemination remains uneven, limiting farmers' understanding of the policy and its potential benefits. These findings indicate that Banjaran Wetan's relatively stable land conditions are influenced more by lower development pressure than by strong LP2B implementation, suggesting the need for stronger policy communication, irrigation support, and local institutional strengthening.

Figure 10. Map of Standard Paddy Fieldss (LBS) and Protected Paddy Fields (LSD) in Banjaran

Wetan Village, Banjaran District, Bandung Regency, accessed through the West Java Wargi Map in 2025.

Source: Processed by researchers from the West Java Wargi Map (https://wargi.jabarprov.go.id/petav2/), 2025.

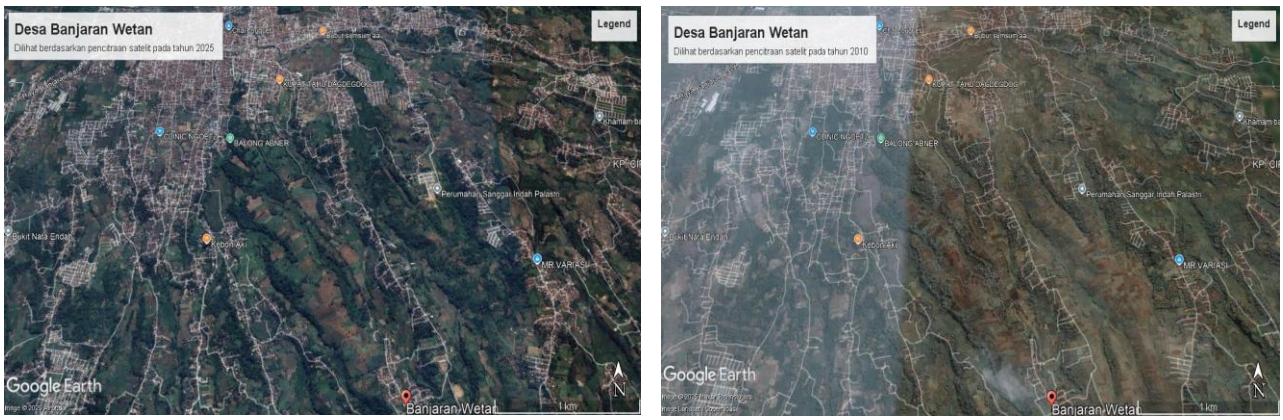


Figure 11. Map of Banjaran Wetan Village viewed through Google Earth Pro with the most recent imagery from 2025 to illustrate actual conditions, and a map of Banjaran Wetan Village viewed through Google Earth Pro with imagery from 2010 to illustrate conditions during that period.

Source: Processed by researchers from Google Earth Pro (2025) and Google Earth Pro (2010 imagery).

Based on Figure 10, the map of Standard Paddy Fields (LBS) and Protected Paddy Fields (LSD) shows that the paddy fields in Banjaran Wetan Village are spread out following the contours of the hilly and valley areas, so they do not form a single large expanse. Figure 11 shows a satellite image from 2025 that shows a mix of agricultural land in the valley area and settlements that have developed along roads and easily accessible areas. Meanwhile, Figure 11, which shows conditions in 2010, shows a wider agricultural land with a still limited residential area. A comparison of these three images shows that land use changes in Banjaran Wetan Village are gradual and relatively limited, although they still require management to maintain agricultural functions.

Banjaran Wetan Village presents a different pattern of LP2B implementation compared with the other study villages. Although land conversion remains relatively limited, the sustainability of agricultural land is primarily supported by relatively low development pressure rather than by strong institutional intervention. Limited irrigation continues to constrain agricultural productivity, while uneven dissemination of LP2B reduces farmers' understanding of the policy and its potential benefits. From the IAD perspective, these findings suggest that favourable policy outcomes may occur under relatively stable external conditions; however, without stronger institutional support, improved communication, and adequate technical assistance, such conditions may not be sustainable in the face of future development pressures. This indicates that proactive institutional strengthening remains necessary even in areas currently experiencing relatively low rates of land conversion.

Agrarian Actors and Land Tenure Characteristics

Field observations and interviews indicate that LP2B implementation involves actors with different rights, responsibilities, and interests regarding agricultural land. These actors include landowners, owner-farmers, sharecroppers, farm laborers, and farmer groups. Their different positions influence how they respond to land protection policies and land conversion pressure.

Landowners possess formal authority over land-use decisions and therefore play a decisive role in determining whether agricultural land is maintained or converted. In several study villages, particularly Jelegong and Bojongsari, a considerable proportion of agricultural land is owned by absentee landowners living outside the village. Consequently, decisions regarding land conversion are often driven by land market opportunities rather than agricultural considerations.

Owner-farmers generally demonstrate a stronger commitment to maintaining paddy fields because their livelihoods depend directly on agricultural production. In contrast, sharecroppers have limited decision-making authority because they cultivate land owned by others. Their primary concern is maintaining seasonal agricultural income rather than making long-term decisions regarding land protection. Farm laborers are indirectly affected by land conversion because the reduction of agricultural land decreases employment opportunities in the agricultural sector.

Farmer groups function as the principal local institutions supporting LP2B implementation. Besides facilitating agricultural extension services, they coordinate access to government assistance, disseminate policy information, and support collective farming activities. However, interviews indicate that the capacity and level of activity of farmer groups vary considerably across villages, resulting in differences in institutional support for LP2B implementation.

These findings demonstrate that LP2B implementation is influenced not only by formal regulations but also by differences in land tenure arrangements and actor interests. Consequently, strengthening farmland protection requires policy instruments that recognize these different actor positions rather than treating rural communities as a homogeneous group.

Discussion

From a theoretical perspective, the findings of this study suggest that the Institutional Analysis and Development (IAD) framework remains highly relevant for explaining LP2B implementation. However, the findings also demonstrate that the effectiveness of institutional rules depends not only on their formal existence but also on their ability to align policy design with local socio-economic realities. In Bandung Regency, policy implementation is constrained by the interaction between land market pressure, village administrative capacity, land tenure arrangements, and inter-organizational coordination, all of which shape how actors interpret and implement formal rules. These findings therefore enrich the application of the IAD framework by highlighting policy design as a critical institutional dimension that mediates the relationship between formal rules and implementation outcomes in peri-urban agricultural governance.

Implementation of the Sustainable Food Crop Land Protection Policy (LP2B) from an Institutional Analysis and Development (IAD) Perspective

An analysis of the implementation of the Sustainable Food Crop Land Protection Policy (LP2B) policy in Bandung Regency shows that this policy cannot be understood as a linear, top-down process, but rather as an arena for multi-actor interactions with diverse interests. Within the Institutional Analysis and Development (IAD) framework developed by Elinor Ostrom, the success of a policy is

largely determined by the relationship between external variables, applicable regulations, and the dynamics of actor interactions within the action arena.

This approach is relevant because LP2B is not merely a technical spatial planning policy but also an institutional system influenced by biophysical, social, and economic factors. Ostrom (2005) emphasized that resource policy failure often occurs when formal regulations are not aligned with local conditions (rules-in-use), a phenomenon also evident in LP2B implementation in Bandung Regency.

External Variables in the Implementation of Sustainable Food Crop Land Protection (LP2B)

Biophysical Conditions

Biophysical conditions constitute a crucial external variable in the implementation of the Sustainable Food Crop Land Protection (LP2B) policy in Bandung Regency. From the perspective of the Institutional Analysis and Development (IAD) framework, these conditions are not merely physical characteristics of agricultural land, but also constraints that shape actors' choices, institutional effectiveness, and policy outcomes. The findings show that the study villages face different biophysical pressures, but two issues appear consistently across the cases: limited irrigation reliability and increasing spatial pressure from non-agricultural land uses.

Irrigation constraints directly affect the capacity of farmers to maintain rice cultivation in protected paddy field areas. In villages such as Jelegong and Sumbersari, limited water availability during the dry season has reduced planting frequency and encouraged farmers to shift to more adaptive crops, including corn, shallots, and other horticultural commodities. This indicates that administrative protection of paddy fields does not automatically ensure the continuation of rice cultivation when supporting ecological conditions are weak. This finding is consistent with Boer and Subbiah (2005) and Rahmawati et al. (2023), who emphasize that drought and water scarcity are major causes of declining agricultural productivity. In the context of LP2B, irrigation scarcity weakens policy effectiveness because it changes farmers' economic calculations and reduces their incentives to maintain paddy fields as food production areas.

Land conversion pressure also functions as a biophysical and spatial constraint. In several villages, paddy fields are increasingly fragmented by settlements, infrastructure development, industrial expansion, and high-value non-rice commodities. This pressure is not limited to areas near urban centers but also affects villages that were previously more agrarian. This pattern supports the findings of Rahmawati et al. (2023) and Kurnia et al. (2022), who show that peri-urban areas in and around Bandung face increasing pressure from residential, property, and industrial development. From an IAD perspective, this spatial transformation changes the choice arena for local actors because agricultural land is no longer valued only as a production resource, but also as an economic asset with higher market value.

The findings also show that biophysical constraints are intensified by institutional weaknesses in infrastructure planning and resource management. In Jelegong, for example, proposals for shallow well development had been submitted but had not yet been prioritized. This illustrates that water scarcity is not merely a natural constraint, but also a governance problem related to the limited responsiveness of policy instruments. Ahmadi et al. (2025) similarly emphasize the importance of irrigation planning and institutional capacity in strengthening agricultural resilience in water-scarce areas. LP2B implementation therefore cannot rely only on spatial designation or legal protection; it also requires technical support that maintains the productive viability of protected paddy fields.

The evidence from Bandung Regency demonstrates that biophysical conditions influence LP2B implementation through the interaction of ecological constraints and economic pressures. Limited irrigation reduces the productive capacity of protected paddy fields, while increasing land values encourage farmers and landowners to consider alternative land uses. As argued by Harewan et al. (2023), land conversion reflects not only a physical transformation of agricultural land but also a shift in its economic function. From the perspective of the IAD framework, these conditions shape actors' incentives and ultimately influence policy outcomes. Consequently, strengthening LP2B requires more than legal designation of protected land; it also depends on improving irrigation infrastructure, controlling spatial expansion, and providing incentive mechanisms that maintain the economic viability of rice farming.

Community Attributes

Community attributes represent an important external variable influencing the implementation of the Sustainable Food Crop Land Protection (LP2B) policy. Within the Institutional Analysis and Development (IAD) framework, community attributes include the social, economic, and institutional characteristics that shape actors' behaviour within the action arena. The findings indicate that LP2B implementation in Bandung Regency is influenced by several interrelated factors, including unequal land ownership, the weak bargaining position of tenant farmers, changing livelihood orientations, limited policy literacy, and variations in the capacity of local farmer organizations.

One of the most prominent findings is the separation between land ownership and land cultivation. While most agricultural land is managed by smallholder or tenant farmers, ownership frequently remains in the hands of individuals living outside the village. This unequal agrarian structure weakens farmers' influence over long-term land-use decisions because decisions regarding land conversion or sale remain under the authority of landowners. Similar findings were reported by Putri et al. (2024), who identified land ownership inequality as a major constraint to the effectiveness of agricultural land protection policies. Likewise, Darmawan (2025) argues that secure land tenure encourages long-term investment in sustainable farming practices. In Bandung Regency, however, limited tenure security reduces farmers' incentives to preserve agricultural land despite their dependence on it for production.

The findings also demonstrate that changing economic orientations have altered the social foundations supporting agricultural land protection. Urban expansion has encouraged many rural households, particularly younger generations, to seek employment in industrial and service sectors that offer more stable incomes than agriculture. As explained by Afzal (2024), structural economic transformation commonly shifts labour away from agriculture as regional economies develop. In the study area, this process has reduced farmer regeneration and weakened the long-term sustainability of rice cultivation. At the same time, increasing land values have changed the way agricultural land is perceived. Paddy fields are increasingly regarded as economic assets with high market value rather than solely as productive resources for food security, making land conversion a rational economic option for many landowners.

Another important finding concerns policy literacy and local institutional capacity. Information regarding LP2B is generally disseminated through village governments and farmer groups, but many farmers, particularly tenant farmers, remain unfamiliar with the objectives and implications of the policy. This finding is consistent with Liu et al. (2025), who demonstrate that policy literacy strongly influences farmers' willingness to participate in agricultural policy implementation. In addition, the capacity of farmer groups varies considerably among villages. While some groups actively facilitate agricultural assistance, coordination, and information exchange, others have only limited organizational capacity. These differences affect the ability of local institutions to support collective action for protecting agricultural land.

The evidence from Bandung Regency demonstrates that community attributes influence LP2B implementation by shaping actors' incentives, participation, and capacity to comply with policy objectives. Unequal land tenure, changing livelihood preferences, limited policy understanding, and uneven institutional capacity collectively reduce the effectiveness of farmland protection despite the existence of formal regulations. From the perspective of the IAD framework, these social and institutional characteristics constitute essential elements of the action arena because they determine how actors interpret policy, respond to economic pressures, and make land-use decisions. Strengthening farmer organizations, improving policy dissemination, and increasing farmers' access to institutional support are therefore essential to improving the long-term effectiveness of LP2B implementation.

Applicable Rules (Rules-in-Use)

From the perspective of the Institutional Analysis and Development (IAD) framework, rules-in-use refer not only to formal regulations but also to how those rules are interpreted, applied, and negotiated in everyday practice. Ostrom (2011) argues that policy failure often results not from the absence of regulations but from a mismatch between formal rules, local conditions, and the capacity of actors responsible for implementation. This situation is evident in the implementation of LP2B in Bandung Regency. Although the policy is supported by a comprehensive legal framework, its implementation continues to face considerable institutional challenges.

The legal foundation of LP2B extends from the national to the local level, including Law No. 41 of 2009, Government Regulation No. 1 of 2011, Presidential Regulation No. 59 of 2019, Ministerial Regulation of ATR/BPN No. 13 of 2021, Ministerial Regulation of ATR/BPN No. 2 of 2024, Bandung Regency Regulation No. 1 of 2019, and Regional Spatial Planning Regulation No. 1 of 2024. These regulations provide a comprehensive institutional framework for protecting sustainable agricultural land. However, the findings demonstrate that the existence of multiple regulations alone has not ensured consistent implementation at the local level.

One of the main challenges concerns the fragmentation of institutional authority. The implementation of LP2B involves multiple government agencies with different mandates in land administration, spatial planning, agricultural development, and permit issuance. This institutional arrangement often creates overlapping responsibilities and inconsistent interpretations of regulatory provisions, particularly in the process of approving land conversion. As a result, formal regulations are not always translated into coherent implementation practices across different administrative levels.

The findings also reveal that the effectiveness of LP2B depends heavily on administrative readiness. In villages such as Bojongsari and Sugihmukti, fiscal incentives, including reductions in Land and Building Tax (PBB), have not been implemented effectively because protected agricultural land has not been clearly distinguished from general land records. In addition, the land replacement mechanism required following land conversion has not consistently maintained the quality and productivity of replacement land. Although replacement areas may satisfy administrative requirements, they often have poorer irrigation systems, lower soil fertility, or less strategic locations for agricultural production. These conditions indicate that compliance with formal regulations does not necessarily guarantee the preservation of agricultural functions.

Informal institutions also influence how LP2B operates in practice. Economic pressures associated with urban expansion, together with limited policy dissemination, encourage many farmers and landowners to prioritize short-term economic returns over long-term agricultural protection. Consequently, formal regulations are not fully internalized as operational rules that guide everyday land-use decisions.

The implementation of LP2B in Bandung Regency illustrates that formal regulations alone are insufficient to achieve effective farmland protection. Their effectiveness ultimately depends on how consistently they are implemented, supported by reliable administrative systems, and understood by local actors. Strengthening institutional coordination, improving land administration, and expanding policy dissemination are therefore essential for narrowing the gap between policy design and implementation.

Arena of Action and Actor Dynamics

The implementation of LP2B in Bandung Regency takes place within an action arena involving farmers, landowners, farmer groups, village governments, district agencies, and development actors. From the perspective of the Institutional Analysis and Development (IAD) framework, these actors do not enter the arena with equal authority, resources, or influence. Differences in access to land, capital, information, and administrative networks shape how actors participate in decision-making and how land-use outcomes are produced.

Farmers, particularly smallholders and sharecroppers, are the actors most directly involved in cultivating agricultural land, yet they often hold the weakest position in land-use decision-making. Their dependence on agricultural land does not necessarily translate into authority over its future use, especially when land ownership is controlled by absentee owners or external actors. This reflects what Malik (2024) describes as structural power inequality in resource management, where those most dependent on a resource often have limited control over decisions affecting it. In the context of LP2B, this weak position reduces farmers' ability to resist conversion pressures or negotiate stronger protection for cultivated land.

Landowners and development actors occupy a more influential position within the action arena. Rising land values in peri-urban areas create strong incentives to convert agricultural land into residential, industrial, or commercial uses. Arnawa et al. (2022) similarly note that pressure from non-agricultural sectors is a major driver of agricultural land conversion in West Java. In Bandung Regency, this dynamic is particularly visible in areas facing infrastructure development and urban expansion. Landowners and investors are better positioned to mobilize financial resources and navigate administrative procedures, making their preferences more influential in shaping land-use change.

Village governments occupy an intermediary position. They are expected to support LP2B implementation through land data collection, policy dissemination, and local monitoring, but they also face pressure to accommodate development needs, infrastructure demands, and local economic aspirations. This dual role creates a governance dilemma. When village administrative capacity is limited and coordination with district agencies remains fragmented, village governments have difficulty translating formal land protection rules into effective local control mechanisms.

The actor dynamics in Bandung Regency indicate that LP2B implementation is not simply a matter of regulatory enforcement. It is shaped by unequal power relations, uneven access to information, and different levels of influence over land-use decisions. Formal rules may restrict land conversion, but their effectiveness is weakened when actors with stronger economic and administrative resources are able to shape outcomes more effectively than farmers or village-level institutions. Strengthening LP2B therefore requires more inclusive governance arrangements that improve farmers' participation, clarify village authority, and strengthen coordination between local institutions and district agencies.

Actor Rationality

From the perspective of the Institutional Analysis and Development (IAD) framework, actors are not viewed as passive policy implementers but as decision-makers who respond to opportunities and constraints according to their interests, available resources, and institutional environment. The implementation of LP2B in Bandung Regency therefore reflects the interaction of different forms of rationality rather than a uniform commitment to farmland protection. Farmers, landowners, village governments, farmer groups, and development actors each pursue objectives that they perceive as the most beneficial or feasible within their respective circumstances.

For smallholder and tenant farmers, rationality is primarily shaped by livelihood security. The findings show that uncertainty in irrigation, fluctuating rice prices, unstable production, and insecure land tenure encourage farmers to prioritize decisions that reduce production risks and provide more immediate economic returns. In villages such as Jelegong and Sumbersari, this is reflected in the shift from rice cultivation to horticultural crops that require less water and generate higher market value. This behaviour is consistent with rational choice theory, which suggests that individuals select alternatives that maximize expected benefits under existing constraints (Thomas et al., 2022). In rural agricultural systems, however, maximizing utility often means minimizing economic risk rather than maximizing profit.

Landowners operate under a different set of incentives (Thomas et al., 2022). Particularly in peri-urban areas, agricultural land is increasingly viewed as an investment asset whose value continues to increase with urban expansion and infrastructure development. The findings from Bojongsari, Jelegong, and Banjaran Wetan indicate that decisions regarding land conversion are more strongly influenced by land market opportunities than by the long-term function of agricultural land for food production. This pattern is also consistent with Mulya and Hudalah (2024), who argue that agricultural land in peri-urban regions is increasingly valued for its commercial and development potential. Consequently, the economic exchange value of land frequently outweighs its productive value, creating incentives that conflict with the objectives of LP2B.

Village governments also make decisions under institutional constraints. On the one hand, they are responsible for supporting LP2B through land administration, policy dissemination, and local monitoring. On the other hand, they must simultaneously respond to demands for infrastructure development, public services, and local economic growth. This places village governments in a condition of bounded rationality, where decisions are made within the limits of available information, administrative capacity, and political considerations. Their role therefore often involves balancing agricultural land protection with competing development priorities rather than pursuing conservation objectives alone.

Farmer groups and agricultural extension officers also demonstrate distinct forms of rationality. Farmer groups generally prioritize programs that provide direct benefits to their members, such as agricultural inputs, machinery assistance, irrigation improvement, and production support, whereas agricultural extension officers focus primarily on maintaining agricultural productivity and farmers' incomes. These implementation priorities are understandable because they directly address farmers' immediate needs, although they may reduce attention to the longer-term objective of agricultural land protection.

The different forms of rationality identified in this study help explain why LP2B implementation frequently encounters institutional tensions despite the existence of a comprehensive regulatory framework. Farmers seek livelihood security, landowners respond to market opportunities, village governments balance conservation with development demands, and supporting institutions prioritize practical implementation needs. From the perspective of the IAD framework, these differences demonstrate that policy effectiveness depends not only on regulatory compliance but also on whether policy incentives are capable of aligning individual rationality with collective objectives. Strengthening LP2B therefore requires incentive mechanisms that make long-term farmland protection economically and institutionally attractive for all actors involved.

Interaction, Cooperation, and Conflict

Within the Institutional Analysis and Development (IAD) framework, interactions among actors in the action arena are central to explaining how policy implementation produces particular outcomes. In the case of LP2B implementation in Bandung Regency, these interactions are characterized by a combination of cooperation and conflict. Cooperation tends to occur in technical and operational agricultural activities, while conflict is more visible in strategic issues related to land control, conversion decisions, and competing economic interests.

The most visible form of cooperation is the relationship between farmer groups and the Agricultural Extension Center (BPP). Farmer groups function as local intermediaries connecting farmers with government programs, while BPP provides technical assistance, agricultural counseling, and knowledge transfer related to cultivation practices. Through this relationship, farmers gain access to agricultural information, production inputs, and productivity improvement programs. This finding is consistent with Firmanto et al. (2023), who emphasize the role of agricultural extension workers in strengthening farmers' institutional capacity and supporting innovation adoption. Villages with more active farmer groups also tend to show better coordination in agricultural program implementation.

This cooperation, however, has not been fully integrated into the LP2B agenda. The interaction between farmer groups and BPP remains primarily focused on production-related matters such as fertilizer use, crop productivity, pest management, and agricultural machinery assistance. Land protection, spatial control, and monitoring of paddy field conversion have not yet become central components of this collaboration. This indicates that existing local cooperation supports agricultural productivity but does not automatically strengthen institutional commitment to farmland protection.

Conflict in LP2B implementation tends to be latent rather than openly confrontational. One important source of tension lies between tenant farmers and landowners. Tenant farmers have an interest in maintaining agricultural land as a source of livelihood, while landowners may view land as an asset that can be sold or converted when market opportunities arise. These conflicting interests influence land-use decisions even when they are not expressed as direct disputes. Similar tensions also occur between local communities and development actors in areas experiencing strong urbanization pressure, such as Bojongsari and Jelegong. This pattern is consistent with Leitner et al. (2023), who show that peri-urban transformation often generates conflict between large-scale economic interests and local livelihood interests.

Vertical tensions also emerge from differences in policy understanding between government institutions and local communities. While government actors promote LP2B as a land protection policy, many farmers and landowners do not clearly perceive its direct benefits. Limited policy dissemination contributes to passive resistance, weak compliance, and limited participation in policy implementation. From the IAD perspective, these interaction patterns show that policy outcomes are shaped not only by the existence of rules, but also by how actors communicate, negotiate, and respond to those rules within the local action arena.

The interaction pattern in Bandung Regency suggests that LP2B implementation requires more than technical cooperation among agricultural actors. Productive cooperation between farmer groups and extension officers needs to be connected more directly to land protection objectives, while latent conflicts over land ownership, land value, and development interests require clearer mediation mechanisms. Strengthening transparency, public participation, and stakeholder dialogue would help transform the action arena from a fragmented space of competing interests into a more coordinated institutional setting for Sustainable Food Crop Land Protection.

Synthesis of Findings Across Villages, Policy Implications, and Critical Reflection

A cross-village analysis shows that LP2B implementation in Bandung Regency is strongly shaped by local institutional and spatial contexts. Although the five study villages operate under the same regulatory framework, their implementation dynamics differ according to development pressure, irrigation conditions, agrarian structure, and village institutional capacity. Villages facing strong urbanization and infrastructure pressure, such as Bojongsari and Jelegong, are more vulnerable to land conversion because agricultural land competes directly with residential, industrial, and commercial development. Villages such as Sumbersari and Banjaran Wetan face a different challenge, where limited irrigation encourages farmers to adjust cropping patterns or shift to commodities that are more adaptive to water scarcity. This variation shows that LP2B implementation cannot be understood as a uniform administrative process; it is shaped by the specific local conditions that influence actors' decisions and institutional responses.

These cross-village differences support the argument that agricultural land protection policies must be contextual and adaptive. Rahman et al. (2023) emphasize that effective development policies require attention to local realities, community experience, and the participation of local actors. In Bandung Regency, this means that LP2B cannot rely solely on formal regulations issued at the central or regional level. The policy must also respond to village-level problems such as irrigation scarcity, land market pressure, unequal land ownership, limited policy literacy, and weak administrative capacity. For areas under strong development pressure, stricter land conversion monitoring, inter-agency permit verification, and village-level land-use supervision are necessary. For irrigation-vulnerable areas, policy priorities should focus on irrigation rehabilitation, shallow and deep well development, and targeted water management programs.

The comparison across villages also indicates that local institutions play a decisive role in translating LP2B from a formal regulation into concrete implementation. Villages with active farmer groups, support from agricultural extension officers, or village-level regulations tend to have stronger capacity to maintain agricultural functions. In contrast, villages with weak institutional arrangements are more vulnerable to conversion pressure and policy neglect. Local institutions therefore function not only as administrative units, but also as arenas for coordination, mediation, information distribution, and collective action. Strengthening farmer groups should not be limited to production assistance; they also need to be involved in LP2B monitoring, policy dissemination, and land protection decision-making.

Economic incentives remain a critical weakness in the current policy design. Farmers and landowners often face rational economic choices in which land conversion, land sale, or commodity shifting appears more beneficial than maintaining rice cultivation. If LP2B is implemented mainly through prohibition without sufficient incentives, it will remain less competitive than land market pressure. Fiscal incentives, irrigation support, agricultural input assistance, improved market access, and crop price protection are needed to make farmland protection economically viable. More operational instruments, such as differentiated Land and Building Tax reductions for protected agricultural land, irrigation maintenance subsidies, and priority access to agricultural machinery assistance for farmers within LP2B areas, would help align policy objectives with actors' economic interests.

The findings also point to a broader policy design problem. LP2B implementation in Bandung Regency is constrained not only by technical issues such as irrigation and land administration, but also by structural problems involving unequal land ownership, fragmented inter-agency coordination, urbanization pressure, and the mismatch between formal rules and local socio-economic realities. Ostrom (2011) argues that the success of resource governance depends on the alignment between institutional design and social-ecological conditions. The Bandung Regency case supports this argument by showing that LP2B failure is not simply an implementation gap, but a design gap in which formal rules are insufficiently connected to actors' incentives, village capacity, and local governance arrangements.

This synthesis suggests that LP2B needs to be strengthened as a governance framework rather than only as a spatial or legal instrument. Paddy field protection requires coordination between agricultural policy, spatial planning, land administration, infrastructure development, and local economic incentives. The policy should bridge the short-term interests of farmers, landowners, village governments, and development actors with the long-term objective of food security. In this sense, improving LP2B implementation requires an incentive-based and institutionally integrated policy

redesign that supports sustainable agricultural livelihoods while controlling the conversion of paddy fields in peri-urban areas.

D. CONCLUSION AND RECOMMENDATION

Conclusion

This study identifies three principal findings regarding the implementation of the Sustainable Food Crop Land Protection (LP2B) policy in Bandung Regency. First, LP2B implementation has not effectively controlled paddy field conversion because formal policy objectives remain insufficiently aligned with local socio-economic conditions, irrigation availability, land tenure arrangements, and development pressure across the five study villages. Second, the effectiveness of LP2B is strongly influenced by institutional factors, particularly weak inter-agency coordination, inconsistent land information, uneven policy dissemination, limited village administrative capacity, and the absence of operational incentive mechanisms that encourage farmers and landowners to maintain protected agricultural land. Third, differences in actor interests and land tenure arrangements—including landowners, owner-farmers, sharecroppers, farm laborers, and farmer groups—shape how local actors respond to land protection policies, resulting in different implementation outcomes across villages despite being governed by the same regulatory framework.

From a theoretical perspective, this study demonstrates the usefulness of the Institutional Analysis and Development (IAD) framework in explaining how biophysical conditions, community attributes, rules-in-use, and actor interactions collectively influence policy implementation outcomes. Rather than viewing LP2B implementation solely as a matter of regulatory compliance, the findings highlight that policy effectiveness depends on the interaction between institutional arrangements and local implementation contexts. This extends the application of the IAD framework by emphasizing the importance of policy design, institutional coordination, and actor incentives in peri-urban agricultural land governance.

These findings imply that strengthening farmland protection requires more than expanding the legal framework. Effective LP2B implementation depends on improving institutional coordination, integrating reliable land information systems, strengthening village-level governance, and designing incentive mechanisms that better align the long-term objectives of farmland protection with the economic realities faced by local actors.

Recommendations

Improving the implementation of LP2B in Bandung Regency requires a more integrated, adaptive, and institutionally coordinated approach. First, the district government, coordinated by the Bandung Regency Development Planning Agency (Bappeda), should strengthen cross-sectoral coordination by integrating agricultural land protection into regional spatial planning, infrastructure development, and investment policies. Regular coordination among the Agriculture Office, ATR/BPN, the Public Works Office, and village governments should be institutionalized to ensure that land-use decisions remain consistent with LP2B objectives.

Second, the Agriculture Office should prioritize the rehabilitation of irrigation infrastructure, expand technical assistance through agricultural extension services, and strengthen the capacity of farmer groups to support sustainable agricultural production within protected paddy field areas. At the village level, local governments should improve land administration, regularly update protected paddy field data, strengthen policy dissemination, and actively involve farmer groups in monitoring land-use change and reporting potential violations.

Third, ATR/BPN, together with relevant local government agencies, should establish an integrated and regularly updated land information system to improve the accuracy of protected paddy field mapping and reduce inconsistencies between policy documents and actual land conditions. A reliable spatial database would also support more transparent decision-making regarding land-use permits and strengthen the control of paddy field conversion.

Finally, the district government should redesign the existing incentive mechanism by providing more accessible fiscal incentives, including land tax reductions for protected agricultural land, together with targeted support for irrigation development, agricultural inputs, and farm machinery. Aligning these incentives with farmers' economic realities would increase their willingness to maintain

agricultural land while strengthening the long-term effectiveness of LP2B as an instrument for protecting farmland and supporting regional food security.

These recommendations are derived from the institutional constraints identified in this study and are intended to strengthen the alignment between policy design, institutional capacity, and local implementation of LP2B. By translating the empirical findings into more operational policy actions, this study provides practical guidance for local governments seeking to improve Sustainable Food Crop Land Protection in peri-urban regions facing similar development pressures.

REFERENCE

Afzal, H. (2024). Sectoral shifts of employment in Pakistan: Analyzing the decline in agricultural development and the rise of service sector. *International Journal of Applied Service Marketing Perspectives, 13*(1), 1–9.

Ahmadi, A., Keshavarz, M., & Ejlali, F. (2025). Resilience to climate change in agricultural water-scarce areas: The major obstacles and adaptive strategies. *Water Resources Management, 39*(3), 1195–1214.

Akbari, M., Foroudi, P., Shahmoradi, M., Padash, H., Parizi, Z. S., Khosravani, A., Ataei, P., & Cuomo, M. T. (2022). The evolution of food security: Where are we now, where should we go next? *Sustainability, 14*(6), 3634.

Arnawa, I. K., Columna, N. T., & Tariningsih, D. (2022). Functional shifting from agricultural land into non-agriculture. *Soca: Jurnal Sosial Ekonomi Pertanian, 16*(1), 109.

Badan Pangan Nasional. (2025). *Rencana Strategis Badan Pangan Nasional Tahun 2025–2029*. Badan Pangan Nasional. https://esakip.badanpangan.go.id/dok/pk/renstra_2025101764568435.pdf

Bandung Regency Regulation No. 1 of 2019 concerning the Protection of Sustainable Food Agricultural Land. Regional Gazette of Bandung Regency Year 2019 Number 1. https://peraturan.bpk.go.id/Details/110786/perda-kab-bandung-no-1-tahun-2019

Boer, R., & Subbiah, A. R. (2005). Agricultural drought in Indonesia. In *Monitoring and predicting agricultural drought: A global study* (pp. 330–344).

Creswell, J. (2016). *Research design: Pendekatan metode kualitatif, kuantitatif, dan campuran* (4th ed.). Pustaka Pelajar.

Darmawan, R. (2025). Longitudinal examination of policy reforms encouraging sustainable land use and their implications for food security and rural livelihoods. *Transactions on Social Innovation, Digital Inclusion, and Ethical AI, 15*(2), 18–27.

Firmanto, A., Ngarawula, B., & Wahyudi, C. (2023). Actor relationship model in empowering local farmers community base sustainable development to increase productivity: Study of social interaction between field extension officers and farmers in Rubaru District, Sumenep Regency. *International Journal of Research in Social Science and Humanities, 4*(11), 27–49.

Gafuraningtyas, D., Setiadi, H., & Mandini Manessa, M. D. (2024). Analyzing farmers' engagement with sustainable agricultural policies: Insights from Indonesia's LP2B initiatives. *Jurnal Pengelolaan Sumberdaya Alam dan Lingkungan, 14*(2).

Ghosh, A., Kumar, A., & Biswas, G. (2024). Exponential population growth and global food security: Challenges and alternatives. In *Bioremediation of emerging contaminants from soils* (pp. 1–20). Elsevier.

Government Regulation No. 1 of 2011 concerning the Determination and Conversion of Sustainable Food Agricultural Land. State Gazette of the Republic of Indonesia Year 2011 Number 2, Supplement to the State Gazette of the Republic of Indonesia Number 5185. https://peraturan.bpk.go.id/Details/5121/pp-no-1-tahun-2011

Harewan, Y., Wurarah, R. N., Santoso, B., & Sabariah, V. (2023). Analysis of land conversion to economic growth: The case of other purpose areas. *IOP Conference Series: Earth and Environmental Science, 1192*(1), 012052.

Kementerian Pertanian Republik Indonesia. (2021). *Rencana Kerja Kementerian Pertanian Tahun 2021*. Kementerian Pertanian Republik Indonesia. https://ppid.pertanian.go.id/doc/1/Renja%20Kementan%202021.pdf

Kurnia, A. A., Rustiadi, E., Fauzi, A., Pravitasari, A. E., Saizen, I., & Ženka, J. (2022). Understanding industrial land development on rural-urban land transformation of Jakarta Megacity's outer suburb. *Land, 11*(5), 670.

Law No. 41 of 2009 concerning the Protection of Sustainable Food Agricultural Land. State Gazette of the Republic of Indonesia Year 2009 Number 149, Supplement to the State Gazette of the Republic of Indonesia Number 5068. https://peraturan.bpk.go.id/Details/38786/uu-no-41-tahun-2009

Leitner, H., Nowak, S., & Sheppard, E. (2023). Everyday speculation in the remaking of peri-urban livelihoods and landscapes. *Environment and Planning A: Economy and Space, 55*(2), 388–406.

Li, M., Li, J., Haq, S. ul, & Nadeem, M. (2024). Agriculture land use transformation: A threat to sustainable food production systems, rural food security, and farmer well-being?. *PLOS ONE, 19*(1), e0296332.

Liu, H., Chen, Z., Wen, S., Zhang, J., & Xia, X. (2025). Impact of digital literacy on farmers' adoption behaviors of green production technologies. *Agriculture, 15*(3), 303.

Malik, I. H. (2024). Can political ecology be decolonised? A dialogue with Paul Robbins. *Geo: Geography and Environment, 11*(1), e00140.

Mertina, S., Susanti, A., Alamsyah, M. N., & Irfan, M. (2025). Implementation of protection policy sustainable food agricultural land (LP2B) in Balinggi District, Parigi Moutong Regency. *International Journal of Multidisciplinary Research and Growth Evaluation, 6*(1), 730–739.

Miles, M. B., Huberman, A. M., & Saldana, J. (2014). *Qualitative data analysis: A methods sourcebook* (3rd ed.). Sage Publications.

Ministerial Regulation of ATR/BPN No. 13 of 2021 concerning the Implementation of Suitability of Spatial Utilization Activities and Synchronization of Spatial Utilization Programs. State Bulletin of the Republic of Indonesia Year 2021 Number 330. https://peraturan.bpk.go.id/Details/209768/permen-atrkepala-bpn-no-13-tahun-2021

Ministerial Regulation of ATR/BPN No. 2 of 2024 concerning Procedures for Verifying Paddy Field Data against Land and Spatial Planning Data, Determining Protected Paddy Field Maps, and Providing Recommendations for Changes in Land Use on Protected Paddy Fields. State Bulletin of the Republic of Indonesia Year 2024 Number 116. https://peraturan.bpk.go.id/Details/307143/permen-atrkepala-bpn-no-2-tahun-2024

Mulya, S. P., & Hudalah, D. (2024). Agricultural intensity for sustainable regional development: A case study in peri-urban areas of Karawang Regency, Indonesia. *Regional Sustainability, 5*(1), 100117.

Ostrom, E. (2011). Background on the institutional analysis and development framework. *Policy Studies Journal, 39*(1), 7–27.

Panjaitan, P. H., Darma, S., Sulistioadi, Y. B., Zulkarnain, Z., Fahrunsyah, F., & Ibrahim, I. (2026). Penilaian kesesuaian lahan untuk pengembangan tanaman padi sawah irigasi (*Oryza sativa* L.) di Kota Samarinda. *Jurnal Agroekoteknologi Tropika Lembab, 8*(2), 76–82. https://doi.org/10.30872/jatl.8.2.2026.21945.76-82

Presidential Regulation No. 59 of 2019 concerning Control of Paddy Field Conversion. State Gazette of the Republic of Indonesia Year 2019 Number 163. https://peraturan.bpk.go.id/Details/120618/perpres-no-59-tahun-2019

Purba, I. V., Handayani, I. G. A. K. R., Karjoko, L., & Anantanatorn, A. (2025). Implications of agricultural land conversion for sustainable food security: Evidence from Vietnam. *Contrarius, 1*(1), 1–19.

Putri, N. A., Sarmilah, S., Velda, J., & Zschock, W. M. (2024). Bridging the gap by exploring inequalities in access to land and disparities in agrarian law in Indonesia. *Jurnal Ilmu Kenotariatan, 5*(1), 1.

Rahman, M. F., Falzon, D., Robinson, S., Kuhl, L., Westoby, R., Omukuti, J., Schipper, E. L. F., McNamara, K. E., Resurrección, B. P., & Mfitumukiza, D. (2023). Locally led adaptation: Promise, pitfalls, and possibilities. *Ambio, 52*(10), 1543–1557.

Rahmawati, Y., Ichsan, A. K. N., Brintanti, A. R. D., & Jamil, I. R. (2023). Geo-spatial analysis: The impact of agriculture productivity, drought, and irrigation on poverty in East Java, Indonesia. *Letters in Spatial and Resource Sciences, 16*(1), 27.

Regional Spatial Planning Regulation No. 1 of 2024 concerning the Spatial Plan of Bandung Regency for 2024–2044. Regional Gazette of Bandung Regency Year 2024 Number 1. https://jdih.bandungkab.go.id/hukum/detail_hukum/8804

Saifuddin, R. M. S., Dawud, J., Abdullah, S., & Afandi, M. N. (2024). Strategi kebijakan perlindungan lahan pertanian pangan berkelanjutan (LP2B) di Kota Sukabumi. *Jurnal Media Administrasi Terapan, 5*(1), 34–44.

Sutter, C., Bhatt, B., & Qureshi, I. (2026). To be or not to be (aligned with elites): Navigating systemic power within informal institutions. *Academy of Management Journal*. https://doi.org/10.5465/amj.2023.0515

Thomas, K. J., Baumer, E. P., & Loughran, T. A. (2022). Structural predictors of choice: Testing a multilevel rational choice theory of crime. *Criminology, 60*(4), 606–636.

West Java Regional Regulation No. 12 of 2014 concerning the Management of Metropolitan Development and Growth Centers in West Java. https://jdih.jabarprov.go.id/page/info/produk/7136