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Policy Evaluation of Ministerial Decree No. 1589/SK-HK 0201/XII/2021 on Protected Paddy Fields Map and Its Alignment with Cimahi City's 2012-2032 Spatial Plan

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Abstract:

Indonesia is an agricultural country with a total area of 189,241,009 hectares with amazing food security potential. The issue of land conversion is a barrier for Indonesia to achieve this potential. Therefore, the Ministry of Agrarian and Spatial Planning/National Land Agency issued Decree No. 1589/SK-HK.02.01/XII/2021 on the Determination of Protected Paddy Fields Map. The Decree of the Ministry of Agrarian and Spatial Planning/National Land Agency on Protected Paddy Fields (LSD) is applied to 8 provinces throughout Indonesia, one of which is West Java Province, so Cimahi City also has the responsibility to implement this Protected Paddy Fields (LSD) program. In achieving the objective to see the implementation of Protected Paddy Fields (LSD) in Cimahi City, researchers used land cover analysis, overlay, SWOT. Land cover analysis resulted in a time lapse from 2012 to 2022 with the initial rice field area of 591.89 Ha reduced to 323.63 Ha. The results of the LSD overlay analysis with the Spatial Pattern stated that the LSD that can be maintained is 33.03 Ha. The results of SWOT analysis of X and Y coefficients (2.33, 1.44) on SWOT analysis show that it is located in quadrant I, namely Aggressive, quadrant I provides strict direction that maintaining LSD is mandatory.

Keywords: *Protected Paddy Fields (LSD), Cimahi City, Policy*

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1. Introduction

Indonesia is known as a country with abundant agrarian resources. One of the agricultural sectors which is the backbone of the Indonesian economy is the agricultural sector, especially in rice production (Massie, et al., 2021). However, in recent years, there has been a significant reduction in rice fields caused by various factors, such as urbanization, infrastructure development, and land conversion for non-agricultural needs. Cimahi City, one of the cities in West Java Province, is an area affected by this phenomenon. Drastic land use changes in this region have an impact on the availability of protected rice fields (LSD) and threaten local food security (Nurrahma, et al., 2024).

In 2021, the Ministry of Agrarian Affairs and Spatial Planning/National Land Agency (ATR/BPN) issued Decree (SK) Number 1589/SK-HK.02.01/XII/2021 regarding the determination of Protected Rice Land Maps (LSD) in various regions, including Cimahi City. This policy aims to protect rice fields from conversion and protect food security. However, based on the data obtained, there is a difference between the LSD area specified in the policy and the existing rice field area recorded in Cimahi City. This shows that there are indications that land conversion has not been resolved properly. This research seeks to evaluate the

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implementation of this policy and examine its implications for food security in the region (Lukman, et al., 2024).

Indonesia as an agricultural country has an important role in the agricultural sector. However, along with economic development and urbanization, agricultural land, especially rice fields, has experienced significant shrinkage. The phenomenon of changing the function of rice fields is very worrying, especially in areas with high levels of urbanization such as Cimahi City. Conversion of rice fields into residential, industrial and public infrastructure areas is increasingly occurring and causing a reduction in the area of land that functions as a source of food for the community. In West Java Province, based on 2018-2019 data, the area of rice fields has decreased from 930,334 hectares to 928,218 hectares, showing a continuous downward trend (Mulyadi, et al., 2020).

The land conversion that occurred in Cimahi City not only threatens the availability of agricultural land, but also has a direct impact on local food security. One of the impacts is reduced rice production, which is a staple food for most Indonesians. As the area of rice fields decreases, rice production has the potential to decrease, which could trigger an increase in food prices and increase the economic burden on society, especially among low-income groups. Apart from that, this land conversion is also related to the problem of sub-optimal regional spatial planning. The Cimahi City Regional Spatial Planning Plan (RTRW) for 2012-2032 should be a reference in maintaining a balance between infrastructure development and agricultural land protection. However, in practice, the implementation of RTRW is often not in line with the rice field protection policy established by the central government through the ATR/BPN Ministerial Decree. This reflects the lack of coordination between the central and regional governments in maintaining protected rice fields.

The phenomenon of changing the function of rice fields has become a concern in various studies of spatial planning and agrarian policy in Indonesia. According to (Paramasatya and Rudiarto, 2020) the conversion of rice fields mainly occurs in urban areas which are experiencing population growth and increasing demand for land for settlements, industry and other infrastructure. Firman also emphasized that rapid economic growth and urbanization in urban areas are often not balanced with comprehensive and sustainable spatial planning. As a result, productive land that should be maintained for agriculture actually changes its function to non-agricultural land.

A report from the National Development Planning Agency (Bappenas, 2020) revealed that shrinking agricultural land is one of the biggest threats to food security in Indonesia. This report highlights that shrinkage of agricultural land is not only occurring in urban areas, but also in rural areas which traditionally function as agricultural areas. This condition is exacerbated by the lack of strong regulations for protecting sustainable agricultural land. In line with the BAPPENAS report, Law Number 41 of 2009 concerning Protection of Sustainable Food Agricultural Land emphasizes the importance of agricultural land conservation efforts to maintain national food security. However, in its implementation, this law faces various obstacles, such as weak law enforcement, low community participation in land monitoring, and lack of coordination between levels of government. Apart from that, in some cases, local governments actually give permission to convert agricultural land for reasons of economic development and increasing regional income.

Another study by (Suprianto and Cahrial, 2019) identified that the lack of incentives for farmers to maintain their agricultural land is one of the causes of land conversion. Many farmers prefer to sell their land for commercial development because the selling price is higher than the profits obtained from agricultural activities. This phenomenon is increasingly exacerbating the decline in agricultural land area in Indonesia, including in the West Java region.

Several previous studies have examined the impact of land conversion on food security and land use in Indonesia, especially in the West Java region. (Prasada, et al., 2011) in his research on the impact of land conversion in West Java shows that changes in agricultural land use, especially rice fields, have a direct impact on food productivity. This study found a significant correlation between the decline in paddy field area and the decline in rice production in several districts and cities in West Java. Apart from that, Setiawan also found that the conversion of rice fields in West Java was largely influenced by infrastructure development policies which often ignored the protection of agricultural land. Another study by (Putra, 1960) examined the implementation of rice field protection policies in several regions in Indonesia. They found that paddy land protection policies, as regulated in the ATR/BPN Ministerial Regulation, were often not in line with the reality of land use in the field. This mismatch is caused by weak regional government supervision and minimal community participation in the decision-making process regarding land use. This study also highlights the importance of improving coordination between central and regional governments to ensure more effective protection of rice fields.

Additionally, a study by (Pitaloka, 2020) on the impact of RTRW policies on food security in West Java shows that many local governments fail to integrate agricultural land protection into their spatial planning. Handoko concluded that a lack of understanding and awareness of the importance of agricultural land in supporting food security is one of the main factors causing the decline in rice fields in urban areas. This research has several unique aspects that differentiate it from previous research. The main focus of this research is the evaluation of the policy for determining the Protected Rice Field Map (LSD) in Cimahi City which is regulated in the Minister of ATR/BPN Decree Number 1589/SK-HK.02.01/XII/2021. This research seeks to analyze how this policy is in line with the Cimahi City Regional Spatial Planning (RTRW) for 2012-2032, which should be a guideline for the protection and management of agricultural land in the region.

Another uniqueness of this research is the emphasis on the difference between the LSD area determined by the central government and the existing rice field area recorded by the Cimahi City Government. This difference reflects significant land conversion, which needs to be addressed immediately to prevent wider impacts on local food security. This research also highlights how LSD policies can play a role in preventing a food security crisis in Cimahi City, which is an area with a fairly high level of urbanization (Ramadhan and Fasa, 2024). This research also seeks to identify the factors that cause the difference between the specified LSD area and the existing rice field area. These factors can include a lack of supervision, weak law enforcement, and changes in spatial planning policies that do not consider long-term needs for food security. Identification of these factors will be the basis for more effective policy recommendations in protecting rice fields in Cimahi City (Fasa and Revayanti, 2021).

2. Theoretical Background

Land-Use Change and Agricultural Land Conversion

The conversion of agricultural land to non-agricultural uses is a significant challenge in urbanizing regions, posing threats to food security, environmental sustainability, and socio-economic stability. Nurrahma et al. (2024) identified that socio-economic factors, including population growth, urbanization, and economic incentives, drive agricultural land conversion in Klaten Regency. They emphasized the urgent need for stronger land-use regulations to mitigate these transitions and ensure sustainable land management.

Similarly, Paramasatya and Rudiarto (2020) explored the broader impacts of such conversions on growth centers in Majalengka, revealing that urban development disrupts traditional land-use patterns and accelerates the marginalization of agricultural lands. These findings suggest that agricultural protection must be deeply integrated into urban planning policies to balance development goals with sustainability.

2. Policy Frameworks and Spatial Planning

Policy frameworks and spatial planning play critical roles in addressing land-use challenges. The Cimahi City Spatial Plan (RTRW) for 2012-2032 was designed to balance urban development and agricultural preservation, serving as a blueprint for sustainable land management (Cimahi City Government, 2013). However, as urbanization pressures intensify, aligning such regional plans with national policies becomes increasingly essential.

Pitaloka (2020) highlighted the political dimensions of spatial planning laws, arguing that strong legal frameworks are vital for protecting sustainable agricultural lands and enforcing spatial plans effectively. Additionally, Government Regulation No. 21 of 2021 emphasizes the alignment of national spatial policies with local contexts, providing a foundation for evaluating the coherence of Ministerial Decree No. 1589 with Cimahi City's spatial objectives (Central Government, 2021). These frameworks establish a basis for evaluating the decree's practical effectiveness.

3. Protected Paddy Fields (LSD) and Food Security

Protected paddy fields (LSD) serve as a cornerstone for food security and environmental resilience. Graha et al. (2022)assessed the suitability of LSD policies in Denpasar City, uncovering gaps between policy objectives and implementation. Their study highlighted the need for comprehensive land-use planning to ensure that protected areas remain effective against competing developmental pressures.

Moreover, Prasada et al. (2011) examined the impact of wetland conversion on food security in Yogyakarta, emphasizing the adverse effects of shrinking agricultural lands on regional food production. These findings underscore the necessity of implementing robust LSD policies that safeguard agricultural productivity while accommodating urban growth.

4. Environmental and Economic Considerations

Balancing environmental sustainability with economic development is a critical challenge for land-use policy makers. Mangera et al. (2024) conducted an evaluation of land suitability for paddy rice planting in Merauke, demonstrating the importance of geographic and environmental assessments in policy design. Such evaluations ensure that agricultural lands are not only protected but also utilized optimally for food production.

On the economic front, Massie et al. (2021) analyzed the contribution of agriculture to regional economies, particularly in rice farming communities. They advocated for policies that enhance agricultural productivity while promoting economic resilience. Together, these studies highlight the dual objectives of preserving the environment and supporting economic growth in policy formulation.

3. Methodology

Research methods are a process or scientific way to produce discoveries in a problem case. Below is a table of Policy Evaluation Research Methodology in ATR/BPN Decree Number

1589/SK-HK 0201/XII of 2021 concerning Determination of Protected Rice Land Maps (LSD) for the Regional Spatial Planning (RTRW) of Cimahi City for 2012-2032:

Table 1. Research Methodology

Target	Variable	Analysis Method	Data Collection Method	Approach Method	Output
Identification of the existing condition of land owned by the people of Cimahi City as well as the implementation of the 2021 ATR/BPN policy regarding the determination of LSD for the RTRW of Cimahi City for 2012-2032	*Land Use Shapefile (ricefield)*	Land Cover	Decree of the Minister of ATR/BPN Number 1589/SK-HK 0201/XII/2021 and Cimahi City Regional Spatial Planning Plan for 2012-2032	Quantitative Descriptive	Observing the physical condition of the earth's surface in Cimahi City, both man-made (buildings) and non-man-made (vegetation)
	Land Cover Shapefile (rice fields), LSD Shapefile, Spatial Pattern Shapefile	*Overlays*	Decree of the Minister of ATR/BPN Number 1589/SK-HK 0201/XII/2021 and Cimahi City Regional Spatial Planning Plan for 2012-2032	Quantitative Descriptive	There is an overlap between one map data and another map data in this research, namely the Land Cover Map, LSD Map, and Spatial Pattern Map, which produces a new map with gaps so that the extent of the gap can be known.
	Cimahi City internal and external strategic factors	SWOT	Interviews and questionnaires	Quantitative Descriptive	Knowing the strengths, weaknesses, opportunities and threats of Cimahi City related to LSD

Source: Observation results (2024)

Approach Method

The approach method used is a quantitative descriptive approach, a quantitative descriptive approach is an approach that uses a structured, formal and specific or detailed design. The data used is quantitative by counting and measuring, so the main data in this research is a collection of numbers.

Data Acquisition Method

A research can be said to be scientific if there is validity/accuracy of measuring instruments and reliability/trustworthiness. So the data used in this research was obtained from several data collections, which include primary data and secondary data as follows:

Primary Data

Interview

Interviews are a data collection technique carried out in the form of questions both written and free. The interviews conducted in this research came from informants who will be described in Table 2. Informant Groups below.

Table 2. Informant Group

No.	Government Agencies / Informant Groups	Position/Job
1	Cimahi City Food and Agriculture Service	Head of Agriculture and Fisheries Division, Cimahi City Dispantan
2	Cimahi City Public Works and Spatial Planning Department	Head of the Cimahi City DPUPR Spatial Planning Control Section

3	ATR/BPN Cimahi City	Land Data Section
4	Farmer Group	Farmers/Land Owners

Source: Observation results (2024)

Analysis Method

This analytical method contains the analyzes that will be used, including land cover analysis, overlay analysis and incentive and disincentive analysis.

1. Land Cover Analysis

Land cover analysis is a method used to predict,
measure future land development. Land cover includes information about how land is used, whether it is for urban, agricultural, forest, water, or other uses. The aim of land cover analysis in this research is to understand changes in land use, predict the impact of these changes, and plan sustainable land management. The land cover modeling in this research is to identify land cover changes that focus on agricultural land (rice fields).

2. Overlay Analysis

Overlay analysis is the ability to place one map graphic on top of another map graphic and display the results on a computer screen or on a plot. In short, overlay superimposes one digital map on another digital map along with its attributes and produces a combined map of the two which has attribute information from both maps. Overlay is the process of combining data from different layers. In simple terms, overlay is a visual operation that requires more than one layer to be physically combined.

The method used in processing this research data is the overlay method by combining the Protected Rice Land (LSD) map of Cimahi City (Decree of the Minister of ATR/BPN Number 1589/SK-HK.02.01/XII/2021) and the Regional Spatial Planning (RTRW) map.) Cimahi City (Cimahi City Regional Regulation Number 4 of 2013). From the two map data, a classification of areas and gaps between the two will be produced, so that you can see the overlap between each land area on the two maps.

The classification results from the overlay of the two maps will be divided into LSD (Lahan Sawah Dilindungi or Protected Rice Fields) that can be maintained or removed based on several criteria. LSD is maintained if it is located within irrigation canals, agricultural areas, or forest areas. However, LSD can be removed under certain conditions, such as when it contains pre-existing buildings before its designation, is confined by buildings smaller than 5000 square meters, or lies within infrastructure networks or national strategic projects (PSN). Additionally, LSD can be removed if it is situated in industrial areas, trade and service zones, or if a KKPR (Land Use Permit) has been issued for it. Other conditions for removal include if the area is prone to natural disasters, or if unirrigated land with productivity exceeding 6 tons is confined by buildings or lies within industrial zones, infrastructure networks, or non-agricultural land. Moreover, LSD can be eliminated if it exists in priority development areas as designated by spatial planning regulations or is affected by natural disasters.

Analisis SWOT

SWOT (Strength, Weakness, Opportunity, Threat) is a strategy used to analyze a company's position. Therefore, SWOT is an analysis tool (tool of analysis) (Mashuri and Nurjannah, 2020). Through SWOT, we will get a clear and easy picture of our internal conditions (strengths and weaknesses) of an area. Apart from that, through SWOT we can see external conditions (opportunities and threats) that are outside the region. Based on the results of the SWOT analysis, our strengths can be optimized, thereby covering our weaknesses. Or reduce our

weaknesses, so that they don't interfere with our strengths. After that, for a moment this potential is used to take advantage of existing opportunities and reduce competitors' threats (Mashuri and Nurjannah, 2020).

4. Empirical Findings/Result

Land Cover Analysis

The land cover pattern in Cimahi City based on image data obtained from Google Earth is from 2012 to 2022, namely in the form of built-up land and undeveloped land.

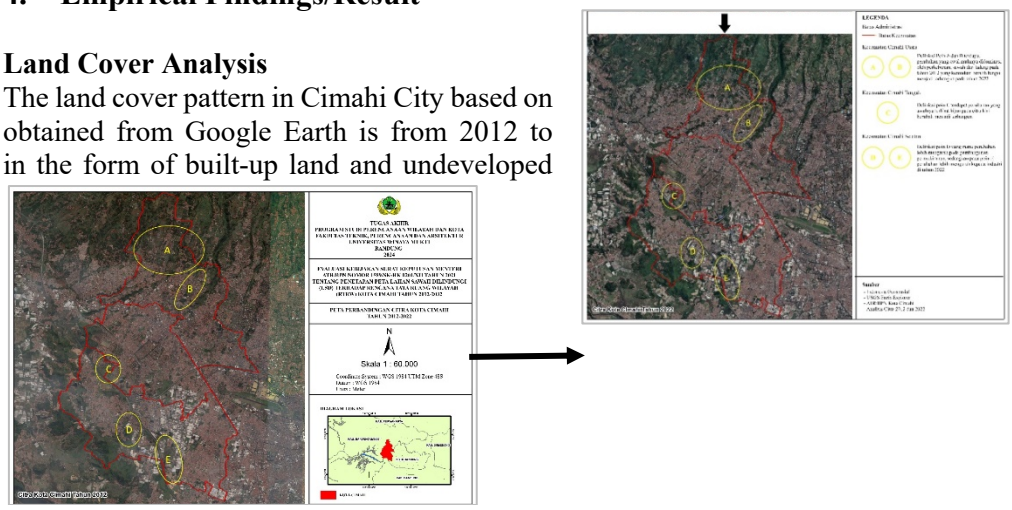

Figure 1. Comparison of Cimahi City Image 2012-2022

Source: Google Earth Image Data Processing, 2024

Based on the table above, the total area of rice fields in Cimahi City in 2012 was 591.89 Ha. The next step is to process the data that has been obtained from the ATR/BPN of Cimahi City in shapefile form. The following is a table of land cover for the existing Cimahi City sub-districts based on sub-districts in 2022.

Table 4. Cimahi City Land Cover in 2022

Cimahi City			
Land Cover	Description	Area (Ha)	Proportion (%)
Thicket	Non Awakened	200.95	5.10
Garden	Non Awakened	332.52	8.43
Field	Non Awakened	482.65	12.24
Ricefield	Non Awakened	323.63	8.21
Grass	Non Awakened	22.34	0.57
Building	Awoke	80.57	2.04
Warehouse	Awakened	0.01	0.00
Industry	Awakened	372.13	9.44
Pool	Woke up	13.06	0.33
Commercial	Woke up	12.80	0.32
Grave	Woke up	18.53	0.47
Field	Woke up	24.05	0.61
Settlement	Awakened	1610.44	40.84
Park	Awakened	53.62	1.36
Vacant land	Awakened	395.79	10.04
Total Area (Ha)		3943.10	100

Source: Processing Shapefile data for Cimahi City Land Cover in 2022 (2024)

Based on the land cover table in Cimahi City presented above, it can be seen that land cover is divided into two statements. For non-built areas, there are five land covers, namely, shrubs, gardens, fields, rice

fields and grass, which dominates the rice field area with an area of 323.63 Ha or 8.21% of the area of Cimahi City.

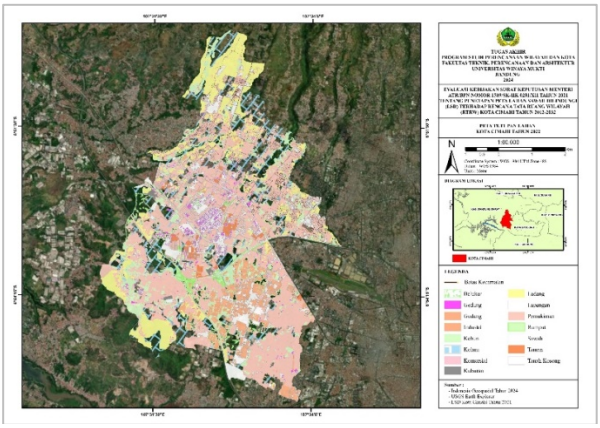

Figure 2. Land Cover Map of Cimahi City in 2022

Source: Data Processing (2024)

Overlay Analysis

1. Overlay of Land Cover and Spatial Patterns

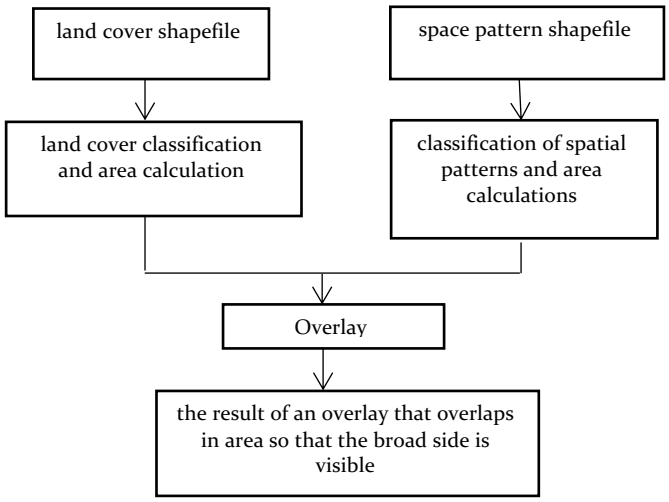

Figure 3. Overlay diagram of land cover and spatial patterns

Source: Data Processing (2024)

Overlay of land cover shapefile data with the spatial pattern of Cimahi City will be divided into three sub-districts, namely North Cimahi District, Central Cimahi District and South Cimahi District.

a. Overlay of Land Cover and Spatial Patterns in North Cimahi District

An overlay of land cover and spatial patterns in North Cimahi District shows that there is an accumulation between Rice Fields-Social Facilities covering an area of 0.24 Ha, Rice Fields-Trade and Service Areas covering an area of 2.34 Ha, Rice Fields-Aquaculture Areas covering an area of 0.08 Ha, Sawah- Central Government Area covering an area of 0.45 Ha, Rice Fields-Water Catchment Area covering an area of 156.55 Ha, Rice Fields-Low Density Housing covering an area of 120.08 Ha, Rice Fields-High Density Housing covering an area of 4.23 Ha, Rice Fields-Toll Road Borders covering an area of 0, 1 Ha, Rice Fields-River Borders covering an area of 23.74 Ha, and Rice Fields-Borders of SUTT covering an area of 3.84 Ha. So, the total overlay of rice fields in North Cimahi District is 287.69 Ha.

b. Overlay of Land Cover and Spatial Patterns in Central Cimahi District

An overlay of land cover and spatial patterns in Central Cimahi District shows that there is an accumulation between Rice Fields-Social Facilities covering an area of 0.03 Ha, Sawah-Cultural Heritage Areas covering an area of 15.49 Ha, Sawah-Industrial Areas covering an area of 0.18 Ha, Sawah-Trade Areas and Services covering an area of 23.96 Ha, Rice Fields-Defense and Security

covering an area of 8.84 Ha, Rice Fields-Low Density Housing covering an area of 6.20 Ha, Rice Fields-Medium Density Housing covering an area of 18.48 Ha, Rice Fields-High Density Housing covering an area of 28.97 Ha Ha, Sawah- Toll Road Border covering an area of 1.82 Ha, Sawah- Railway Border covering an area of 0.10 Ha, Sawah- River Border covering an area of 5.21 Ha, Sawah- SUTT Border covering an area of 0.38 Ha, and Sawah- RTH covering an area of 0.00 Ha. So, the total overlay of rice fields in Cimahi Tengah District is 109.66 Ha.

c. Overlay of Land Cover and Spatial Patterns in North Cimahi District

An overlay of land cover and spatial patterns in South Cimahi District shows that there is an accumulation between Rice Fields-Social Facilities covering an area of 0.17 Ha, Sawah-Cultural Heritage Areas covering an area of 1.48 Ha, Sawah-Industrial Areas covering an area of 34.33 Ha, Sawah-Respan Areas Water covering an area of 20.57 Ha, Rice Fields-Defense and Security covering an area of 35.84 Ha, Rice Fields-Medium Density Housing covering an area of 68.50 Ha, Rice Fields-High Density Housing covering an area of 23.13 Ha, Rice Fields-Prone to Floods covering an area of 4.13 Ha, Sawah- Toll Road Border covering an area of 3.11 Ha, Sawah- RTH covering an area of 0.17 Ha, Sawah- River Border covering an area of 12.71 Ha, Sawah- SUTT Border covering an area of 0.24 Ha. So, the total overlay of rice fields in South Cimahi District is 192.4 Ha.

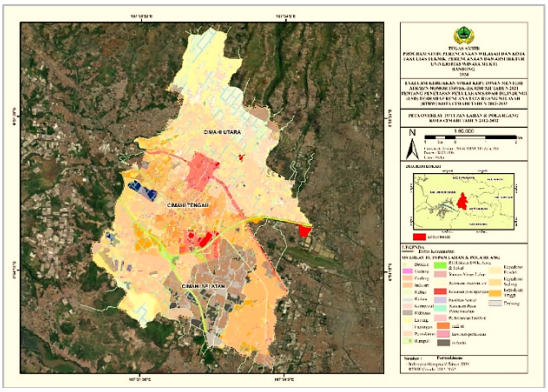

Figure 4. Overlay Map of Land Cover and Spatial Patterns of Cimahi City 2012-2032
Source: Analysis, 2024

2. Overlay LSD and RTRW (Space Pattern)

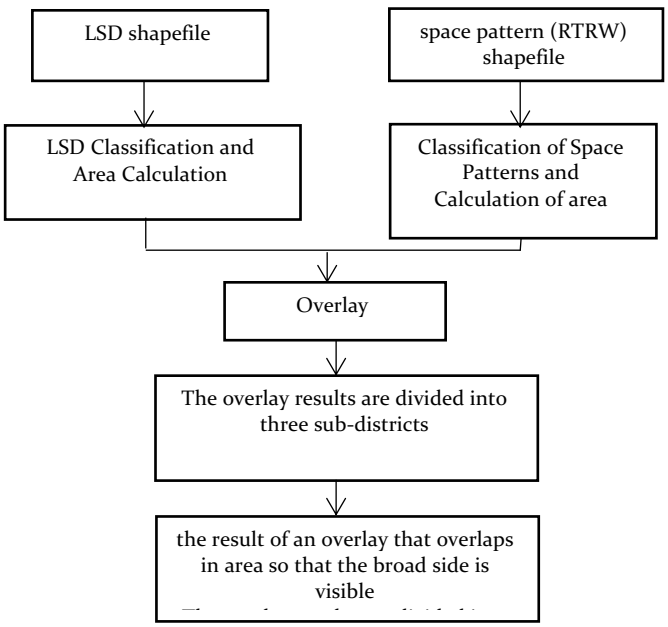

Figure 5. LSD and RTRW Overlay Diagram (Spatial Pattern)
Source: Analysis, 2024

The next step is to overlay the shapefile data between the LSD shapefile and the spatial pattern of Cimahi City which will be divided into three sub-districts. The following is an overlay tabulation of land cover

data with spatial patterns in North Cimahi District, Central Cimahi District, and South Cimahi District. The following is a flow chart of the process for creating LSD and Spatial Pattern overlay maps.

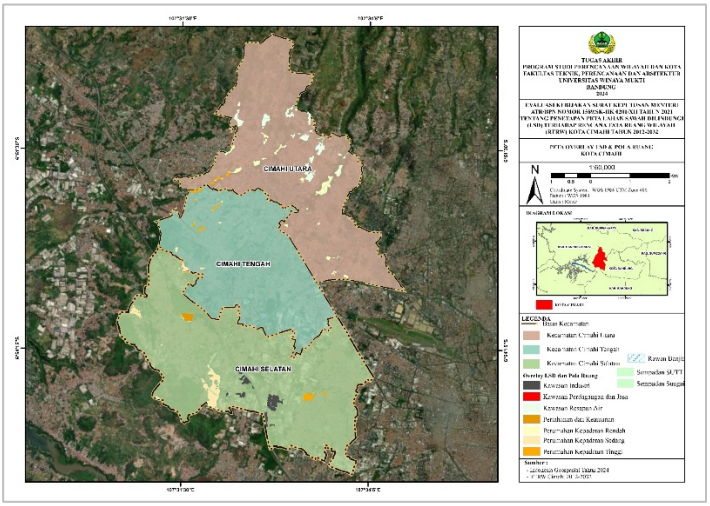

Figure 6. LSD Overlay Map and Cimahi City Spatial Patterns 2012-2032
Source: Analysis, 2024

SWOT Analysis
The SWOT analysis in this research is intended to look at the strengths, weaknesses, opportunities and threats of Cimahi City. SWOT is divided into Internal Strategy Factor Analysis (IFAS) which consists of strengths and weaknesses and External Strategy Factor Analysis (EFAS) which consists of opportunities and threats. Below is the form of the Cimahi City IFAS and EFAS table:

Table 5. Internal Strategy Factor Analysis (IFAS)

No	IFAS			
	S (STRENGTH)			
	STRATEGIC FACTORS	Weight	Rating	Score
1	Regional Regulation No.04 /2013 concerning Cimahi City RTRW	0.30	5	1.50
2	Rice field area 591.89 Ha (Cimahi Land Use shapefile 2012)	0.30	4	1.20
3	Empowerment of Farmer/Farmer Groups	0.20	3	0.60
4	Adequate infrastructure	0.20	3	0.60
	Total	1.00		3.90
	W (WEAKNESS)			
5	Land ownership is controlled by private companies	0.27	2	0.53
6	Less productive harvests	0.27	2	0.53
7	The rice fields are spread out	0.13	2	0.27
8	Development progress is quite rapid	0.33	1	0.33
Total		1.00		1.67

Source: Analysis results (2024)

Notes:
- Skor IFAS pada Strength (S) = 3.90
- Skor IFAS pada Weakness (W) = 1.67

$X = \frac{S-W}{2} = \frac{3.90-1.67}{2} = 2.33$

Based on the calculation results above, it can be seen that X = 2.33. The next calculation is to find out the Y value that we can get from the EFAS table, for further details, see the table below:

Table 6. External Strategy Factor Analysis (EFAS)

No	EFAS			
	O (OPORTUNITY)			
	STRATEGIC FACTORS	Weight	Rating	Score
1	Decree of the Minister of ATR/BPN number 1589/SK-HK 0201/XII of 2021 concerning Determination of Rice Field Maps	0.27	4	1.09
2	Fertilizer subsidies from the government	0.23	3	0.68
3	Collaboration between universities/academics	0.27	3	0.82
4	Technology support from the private sector or government	0.23	3	0.68
	Total	1.00		3.27
	T (THREATS)			
5	Lack of water supply and irrigation	0.17	1	0.17
6	The threat of natural disasters such as floods and earthquakes which can disrupt agricultural sector activities	0.33	2	0.67
7	Rice pest attacks	0.17	2	0.33
8	Erratic harvest period (less than three harvests)	0.33	2	0.67
Total		1.00		1.83

Source: Analysis results (2024)

Catatan:
- Skor EFAS pada Oportunity (O) = 3.27
- Skor EFAS pada Threats (T) = 1.83

$Y = \frac{O-T}{2} = \frac{3.27-1.83}{2} = 1.44$

Based on the calculation results above, it can be seen that Y = 1.44. This means that the two coefficients X and Y (2.33, 1.44) located in quadrant I, namely Aggressive, quadrant I provides firm direction that maintaining LSD is mandatory.

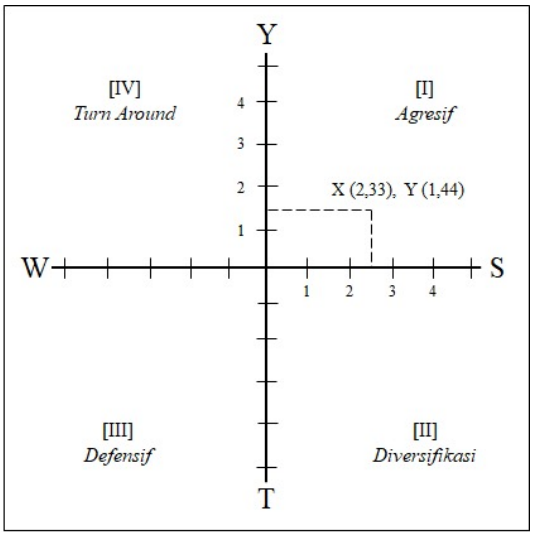

Figure 7. Cimahi City LSD SWOT Curve

Source: Analysis results, 2024

5. Discussion

The Decree of the Minister of ATR/BPN No. 1589/SK-HK.02.01/XII/2021 designates 146.97 hectares of Protected Rice Fields (Lahan Sawah yang Dilindungi or LSD) in Cimahi City as essential to the region's sustainable land use strategy. However, land cover analysis from 2012 to 2022 reveals a significant reduction in rice fields, shrinking from 591.89 hectares to 323.63 hectares—a 45.23% decrease. While the 2022 rice field area still meets the regulatory requirement for 146.97 hectares of LSD, spatial overlay analysis highlights critical challenges. Only 33.03 hectares of LSD remain viable for preservation, with the remaining 113.3 hectares overlapping with unsuitable spatial designations, such as military zones, industrial areas, high-density housing, and flood-prone regions. This finding aligns with studies emphasizing the multifaceted pressures on agricultural land in urban and peri-urban areas, including regulatory conflicts, urban sprawl, and industrial growth (Fasa & Revayanti, 2021; Paramasatya & Rudiarto, 2020).

The loss of agricultural land poses severe risks to food security, echoing concerns raised by Yoga Prasada et al. (2011) about the detrimental effects of land conversion on regional agricultural output. Moreover, Darmawan et al. (2017) identified flooding as a critical factor exacerbating the vulnerability of rice fields, further complicating their preservation. Despite these challenges, the SWOT analysis places Cimahi's efforts in Quadrant I (Aggressive), indicating strong opportunities for proactive strategies. The identified strengths, such as regulatory frameworks like the 2013 Cimahi Spatial Plan and government initiatives for sustainable land use, must be leveraged to address weaknesses, such as fragmented land and conflicting spatial functions (Mulyadi et al., 2020; Pitaloka, 2020).

Cimahi City's government must adopt robust policies, including technological interventions and stakeholder collaboration, to preserve the remaining rice fields. Lessons from Klaten Regency, where socioeconomic factors significantly influenced agricultural land conversion, emphasize the need for comprehensive land-use planning integrating local economic and environmental dynamics (Nurrahma et al., 2024). Ultimately, these measures are vital not only for compliance with LSD regulations but also for ensuring long-term food security and environmental sustainability.

6. Conclusions

Cimahi City, according to the Decree of the Minister of ATR/BPN No. 1589/SK-HK.02.01/XII/2021, has 146.97 hectares of protected rice fields (LSD). From 2012 to 2022, the area decreased by 45.23%, from 591.89 hectares to 323.63 hectares. Despite this reduction, the remaining area still meets the policy requirements. However, only 33.03 hectares can be preserved based on spatial analysis, while 113.3 hectares are at risk due to being within areas such as industrial zones, high-density housing, and flood-prone regions. The SWOT analysis places the interest in maintaining LSD in an aggressive position, urging the Cimahi City Government to take stronger action to protect these areas.

Future research could focus on enhancing land-use planning through advanced monitoring technologies like GIS and remote sensing. Exploring the economic and social impacts of rice field conversion on local communities and food security would provide deeper insights into the consequences of land loss. Additionally, evaluating the effectiveness of existing policies and comparing them with other regions could inform better strategies for balancing urban development and agricultural preservation. Lastly, exploring alternative land management practices, such as agroforestry, could offer sustainable solutions to protect rice fields in the long term.

References:

Bappenas. (2020). *National education infrastructure development report*.

Central Government. (2001). *Law of the Republic of Indonesia Number 9 of 2001 concerning the establishment of Cimahi City*. https://peraturan.bpk.go.id/Details/44874/uu-no-9-tahun-2001

Cimahi City BPS. (2023). *Cimahi City in Figures 2023*. https://cimahikota.bps.go.id/

Darmawan, K., Hani'ah, H., & Suprayogi, A. (2017). Analysis of flood vulnerability levels in Sampang Regency using the overlay method with scoring based on Geographic Information Systems. *Undip Geodesy Journal, 6*(1), 31-40. https://ejournal3.undip.ac.id/index.php/geodesi/article/view/15024

Fasa, A. S., & Revayanti, I. (2021). Study of determining the urban area service center system in Jatinangor District. *Geoplanart, 3*(2), 85. https://doi.org/10.35138/gp.v3i2.347

Graha, I. M. S., Putri, P. I. D., & Dharmayasa, I. G. N. P. (2022). Suitability of protected rice fields (LSD) to the regional spatial planning plan (RTRW) of Denpasar City. *Geo Image, 11*(2), 89–98. http://journal.unnes.ac.id/sju/index.php/geoimage

Government of the Republic of Indonesia. (2013). *Cimahi City Regional Regulation (PERDA) Number 4 of 2013 concerning Cimahi City Regional Spatial Planning for 2012 - 2032*.

Government Regulation of the Republic of Indonesia Number 21 of 2021. (2021). *Government regulation of the Republic of Indonesia Number 21 of 2021 concerning the implementation of spatial arrangement*. https://www.jogloabang.com/lingkungan/pp-21-2021-pengelenggaraan-penataan-ruang

Luqman, M., Badubbah, A., Purwaningsih, S. B., Studi, P., Hukum, I., & Sidoarjo, U. M. (2024). Implementation of the LSD determination by the Ministry of ATR/BPN in Sidoarjo Regency introduction.

Mashuri, M., & Nurjannah, D. (2020). SWOT analysis as a strategy to increase competitiveness. *JPS (Shariah Banking Journal), 1*(1), 97–112. https://doi.org/10.46367/jps.v1i1.205

Mulyadi, H., Rochdiani, D., & Hakim, D. L. (2020). Minapadi business analysis (Case study of the Fajar Jayamukti farmer group in Jayamukti village, Leuwisari District, Tasikmalaya Regency). *Jurnal Ilmiah Ms. AGROINFO GALUH, 7*(1).

Massie, R., Sumual, T. E. M., & Sinolungan, A. Y. R. M. (2021). The role of the agricultural sector in the economy of rice farmers in West Tondano District, Minahasa District. *Jurnal Equilibrium, 2*(2).

Nurrahma, A. F., Darsono, D., & Barokah, U. (2024). Analysis of factors influencing the conversion of rice fields to non-rice fields in Klaten Regency. *Jurnal Ekonomi Pertanian dan Agribisnis, 8*(1), 192. https://doi.org/10.21776/ub.jepa.2024.008.01.15

Paramasatya, A., & Rudiarto, I. (2020). Impact of agriculture land conversion on growth center changes in Majalengka. https://doi.org/10.4108/eai.18-7-2019.2290098

Pitaloka, E. D. A. (2020). Policy for the protection of sustainable agricultural land in the political dimensions of spatial planning law. *Jurnal IUS Kajian Hukum dan Keadilan, 8*(1), 49–78. https://doi.org/10.29303/ius.v8i1.718

Prasada, Y., et al. (2011). Impact of conversion of rice land on food security in the Special Region of Yogyakarta. *Jurnal Gama Sosial, 1*(1), 103–110.

Putra, R. N. (1960). *Adln-Airlangga University Library* (pp. 1–62).

Ramadhan, M., & Fasa, A. S. (2024). Factors that influence the change of land from residential areas to trade and service areas. *Jurnal Konstruksi, 22*(1), 122–129. https://doi.org/10.33364/construction/v.22-1.1606

Suprianto, H. N., & Cahrial, E. (2019). Factors driving the transfer of function of wetland. *Agristan, 1*(1), 12–30.

Van Hove, M., Barchia, M. F., Utama, S. P., Uker, D., & R. M. Mustopa, M. (2022). Analysis of the sustainability of rice production in the rice lands of the Bengkulu Black Water Swamp Irrigation Area, 11(April).

Yoga, P., et al. (2011). Impact of conversion of rice land on food security in the Special Region of Yogyakarta. *Jurnal Gama Sosial, 1*(1), 103–110.