AGRIEKONOMIKA

http://journal.trunojoyo.ac.id/agriekonomika
Volume 12, Nomor 1, 2023
DOI: https://doi.org/10.21107/agriekonomika.v12i1.16589

Agriekonomika has been accredited as a scientific journal by the Ministry of Research-Technology and Higher Education Republic of Indonesia: ***No. 23/E/KPT/2019***
SINTA 2

Farmers' Perspective on Converting Their Paddy Fields in West Java Province

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Received: August 2022; Accepted: March 2023; Published: April 2023

ABSTRACT

The conversion of paddy fields continues to increase rapidly, potentially affecting rice production and threatening national food/rice security. This paper presents farmers' perspectives on various indicators of drivers, controllers and decision-making influencing land conversion. The study is based on a policy and literature approach, supported by field studies using qualitative-quantitative mixed methods in West Java Province. The results show that the driving indicators of land conversion are near main roads/highways; near settlements/trade/industry/ services; and densely populated. Indicators of restraining conversion are space utilization in line with the Spatial Plan; provision of incentives for means of production; and the imposition of land tax disincentives. The most decisive indicators of conversion decision making for farmers' choices are the control / ownership of narrow rice fields; and the production value of rice fields is low.

Keywords: farmers' perspective, driving indicators, controlling indicators, decision-making indicators

INTRODUCTION

Based on the projection of the Central Statistics Agency (BPS), the highest increase in the number of urban population in 2030 occurs in West Java Province reaching ± 86.6% of the total area of West Java Province, followed by Yogyakarta ± 81.3% of the total area of Yogyakarta Province, Banten ± 78.8% of the total area of Banten Province, and Bali Province ± 77.8% of the total area of Bali Province, while DKI Jakarta Province has long had its entire (100.0%) area become urban (Biro Pusat Statistik, 2019). West Java Province is one of the regions that has undergone urbanization most quickly compared to other provinces in Indonesia. This will continue to marginalize and convert agricultural lands/paddy fields. The area of agricultural land per capita will become smaller, contributing to the emergence of farmers with cultivation areas of less than 0.5 ha, which will have an impact on decreasing the level of farmers' welfare (Djoni et al., 2018).

The urbanization process drives massive changes in land use from agricultural land to non-agricultural land which is intended to meet development needs and the socio-economic needs of the landowners. Therefore, land use often shifts due to 1) land acquisition for development carried out by the government and 2) changes in land use by the owners to fulfill their daily needs (Ayu & Heriawanto, 2018). Reduction in agricultural area in line with the addition of residential and industrial areas in order to meet the needs of the population (Sunartomo, 2015). This makes it difficult

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p-ISSN 2301-9948 | e-ISSN 2407-6260

to control and avoid land conversion, both legally due to the stipulation of spatial plans and permits and illegally on the farmers' decisions.

If the proper formula for controlling land conversion cannot be found, then the process will increase rapidly. This process will have a detrimental impact on food sovereignty and security (Prasada, I. M. Y. & Rosa, 2011). The reduction in agricultural land will threaten the sufficiency of rice as the staple food in Indonesia. Unfulfilled food needs will decrease the quality of the population, which will indirectly affect the nation's political stability, economy, and security (Santosa, I.G.N., Adnyana, G.M. & Dinata, 2010)

Changes in land use will also cause environmental degradation in the form of critical land (Santoso & Nurumudin, 2020). As the population pressure on land increases, critical land in Indonesia continues to grow (Nugroho, 2000). Critical land will lead to decreases in soil quality and conservation functions (Indrihastuti et al., 2016), threatening the continuity of the ecosystem and environment in the future (Santoso & Nurumudin, 2020).

Another threatening effect is the process of farmer marginalization which imposes limitations in fulfilling their daily needs. The changes in land use could shift the livelihood pattern from the agricultural field to non-agriculture. The loss of land to cultivate and the farmers' weak skill outside of agriculture causes them to receive few results for the fulfillment of their needs. This then leads to a low quality of life for marginalized farmers (Umanailo, 2016).

Farmers as land owners face various situations and conditions that are quite complex and difficult in withstanding pressures to convert their paddy fields. Farmers are encouraged to make the best logical decisions with consideration of the controlling regulations and their future and their family's future on various factors/indicators which become the foundation for their point of view/perception in deciding to convert their paddy fields to non-paddy fields. The measurement of various influencing indicators, whether functioning as a driving or a controlling force for the decision-making requires an in-depth, targeted, measurable, and comprehensive study, including calculating the value of the weighted score of the farmers' perception in converting their paddy fields.

Previous studies of the factors that drive the farmers to convert their land stated that these factors are the high number of household dependants, irrigation condition constraints, and the high value of the paddy fields (Aprillya, S., Barcia, Faiz & Brata, 2020). According to the study by (Hastuty, 2017)), land production yields, irrigation adequacy, price stability, and cultivation constraints influence land conversion, which was then categorized by (Suprianto, Cahrial, E. & Nuryaman, 2019) as internal factors. External factors influencing land conversion are population growth rates and development policies contained in spatial plans (Suprianto, Cahrial, E. & Nuryaman, 2019). In addition, land conversion occurs when land is allocated for residential areas (Badoa et al., 2018) and tourism sector facilities (Sumantra, I K., Mahardika, M. D., & Arnawa, 2020). The farmers' low income and the price of land are also mentioned as factors that cause land conversion (Laoh et al., 2018):(Arvianti & Abin, 2018)

A few previous studies about controlling factors have been conducted, reporting that control can be achieved through regulations regarding sustainable food agricultural land through spatial planning and imposing a sanction for any violations (Setiawan & Purwadio, 2013). Pearce and Turner (1990) recommended control of paddy field land conversion through (1) regulations; (2) improvement of terms of sale and land tenure patterns; and (3) provision of subsidies and construction of facilities and infrastructure (Iqbal & Sumaryanto, 2016).

Issues regarding land use cannot be resolved instantly through formal regulations (Sriartha & Windia, 2015). Even if various regulations about land function conversion are established by the

government but are not accompanied by public mindfulness in conforming to them, these regulations will not run properly (Ayunita et al., 2021). Community involvement will help achieve land conversion control (Iqbal & Sumaryanto, 2016).

Based on various studies and research conducted previously, not many have discussed the driving factors of land use change based on the perspective of farmers. This paper will involve the community, especially farmers, through their perspectives on various indicators that drive, control and decision making that affect the conversion of paddy fields to non-rice field uses. The results are expected to contribute to recommendations for stakeholders in order to improve the performance of more effective rice field conversion control policies.

METHODS

This study on the farmers' perspective in converting their paddy fields is a study with a policy and literature approach supported by case studies and field research using a mixed qualitative and quantitative basic method. Field studies were carried out to study, understand, and explore various indicators that influence and become a consideration for land-owning farmers in determining options for converting their paddy fields to non-paddy fields use/utilization. The size of the influence is illustrated by the results of the calculation of the weighted scores of public perceptions and statistical analysis of the indicators used in this study.

Case study using purposive sampling method. The selection of sample locations will be carried out in West Java Province covering 1 regency with 2 sample districts. The main criteria for the sample are 1) still have relatively large raw paddy fields based on the Decree of the Minister of ATR / KBPN Number 686 / SK-PG.03.03 / XII / 2019 concerning the Determination of National Standard Land Area in 2019; 2) the area is undergoing development, and 3) represents the sub-district relatively close and/or far from the district government center. The selected sample was Karawang Regency including West Teluk Jambe District which represents the area far from the Karawang Regency government center and East Karawang District which is close to the government center.

The study data collection method was carried out directly by filling out questionnaires by respondents to 2 types of data, secondary data and primary data. The types of data and information collected included area, area of existing, dynamic paddy fields, paddy field conversion, population, and so forth. The respondents needed as a source of data and information in this study were farmers, with at least 30 people per sample district.

The data and information collected were processed and analyzed and were presented in the form of tables and figures. To determine the size of the influence of each indicator on the conversion of paddy fields by farmers, each statement/response item is assessed using a Likert scale, namely: (1) disagree (D), (2) slightly disagree (SD), (3) undecided/agree (A), (4) agree more (AM), and (5) strongly agree (SA).

This study uses three groups of factors consisting of several observation indicators to determine the farmers' perspective on the conversion of their paddy fields as follows.

a. The driving factors according to the farmer's perspective, i.e. using 7 observation indicators that are considered to be able to encourage/trigger the conversion of paddy fields to non-paddy fields by farmers:
   - X1 = Paddy fields whose standard area has not been determined: "Paddy fields whose standard area has not been determined are more vulnerable/sensitive/susceptible to conversion to non-paddy fields"
   - X2 = Paddy fields close to Main Road/Highway: "Paddy fields close to Main Road (Highway/tollroad) are more

vulnerable/sensitive//susceptible to conversion to non-paddy fields"

X3 = Paddy fields close to residential/trade/industrial/service areas: "Paddy fields close to residential/trade/industrial/service areas are more vulnerable/sensitive/susceptible to conversion to non-paddy fields"

X4 = Paddy fields located in non-technical irrigation areas: "Paddy fields located in non-technical irrigation areas are more vulnerable/sensitive/susceptible to conversion to non-paddy fields"

X5 = Paddy fields located in densely populated areas: "Paddy fields located in densely populated areas are more vulnerable/sensitive/susceptible to conversion to non-paddy fields"

X6 = Paddy fields located in areas with poor populations: "Paddy fields located in areas with a low-income population are more vulnerable/sensitive/susceptible to conversion to non-paddy fields

X7 = Paddy fields that have not been certified with land rights: "Paddy fields that have not been certified for land rights are more vulnerable/sensitive/susceptible to conversion to non-paddy fields

b. The controlling factor according to the farmer's perspective, i.e. using seven observation indicators that are considered to be able to prevent/control the conversion of paddy fields to non-paddy fields by farmers:

X8 = Utilization of space in line with the Regional Spatial Plan/Detailed Spatial Plan/Zonation: "The use of space in line with the Regional Spatial Plan/Detailed Spatial Plan/Zonation can control the conversion of paddy fields

X9 = Determination of the Detailed Spatial Plan/Zonation of paddy fields: "The determination of the Detailed Spatial Plan/Zonation of paddy fields can control the conversion of paddy fields"

X10 = Determination of the sustainable food agricultural land map (lahan pertanian pangan berkelanjutan/LP2B) for paddy fields: "The determination of the sustainable food agricultural land map (LP2B) for paddy fields can control the conversion of paddy fields"

X11 = Licensing in paddy fields: "Issuing permits in paddy fields can control the conversion of paddy fields"

X12 = Provision of incentives for rice-farming production facilities (seeds/seedlings, fertilizers, *et cetera*): "Providing incentives in the form of rice farming production facilities such as seeds/seeds, fertilizers, pesticides and so forth can control the conversion of paddy fields"

X13 = Imposition of land tax disincentives: "The imposition of a high land tax on the sale and purchase/transfer of land rights which causes changes in the use of paddy fields can control the conversion of paddy fields"

X14 = Purchase of paddy fields stipulated in the Detailed Spatial Plan/Zonation/LP2B by the Government/Local Government: "Purchase of paddy land that has been stipulated in the Detailed Spatial Plan/Zonation/LP2B by the Government/Local Government can control the conversion of paddy fields"

c. The decision-making factor for the conversion of paddy fields to non-paddy fields according to the farmer's

perspective, i.e. using three observation indicators as an important consideration and determining stage for land-owning farmers:

X15 = Control/ownership of small plots of paddy fields: "Control/ownership of small plots of paddy fields are more vulnerable/sensitive/susceptible to making choices regarding the decision to transfer functions to non-paddy fields"

X16 = Low production value/land rent: "Low paddy field land production/land rent is more vulnerable/sensitive/susceptible to making choices about the decision to change function to non-paddy field land

X17 = Judging/considering the farming profession as a non-option/unattractive: "To judge/consider the farming profession as a non-option/unattractive is to be more vulnerable/sensitive/susceptible in making choices regarding the decision to transfer function to non-paddy fields"

The data analysis methods used were quantitative and qualitative analyses of indicators that affect the conversion of paddy fields based on the values described in the perceived weighted score of the farming community. It is important to calculate this weighted score to determine what indicators have the highest and/or lowest impact on paddy fields conversion, either as drivers, controllers, or farmers' decision-making. Therefore, they could become important input and considerations in selecting and determining strategic control measures. The formulation used to calculate the weighted score for each indicator is as follows:

$$\text{Weighted Score} = \{(nxD)+(nxSD)+(nxA)+(nxAM)+(nxSA)\}/N \quad (1)$$

Where Weighted Score: Indicator weighted score; D: Response/statement disagree; SD: Response/statement slightly disagree; A: Response/statement agree; AM: Response/statement agree more; SA: Response/statement strongly agree; n: Number of respondents who gave a response/statement; N: Total number of respondents.

Weighted Criteria		Weighted Score
D (Disagree)	:	1
SD (Slightly Disagree)	:	2
A (Agree)	:	3
AM (Agree More)	:	4
SA (Strongly Agree)	:	5

Weighted Score/Result Criteria		Score
Very Strongly Drives/Controls/Determines Decision	:	> 4.20 - 5.00
StronglyDrives/Controls/Determines Decision	:	> 3.40 - 4.20
Fairly Drives/Controls/Determines Decision	:	> 2.60 - 3.40
Weakly Drives/Controls/Determines Decision	:	> 1.80 - 2.60
Very Weakly Drives/Controls/Determines Decision	:	1.00 - ≤ 1.80

Furthermore, an Independent Sample T-Test was conducted to understand the differences in indicator weighted scores in areas near and far from the center of the government.

RESULTS AND DISCUSSION

The results and discussion of the study begin with matters relating to the general description of the results of calculating the perception scores of the farming community facing the problem of converting their paddy fields in each region. In terms of area, East Teluk Jambe District is classified in a category where there has been a lot of reduction in the area of paddy fields with an average of ± 105.75 Ha/year. Similarly, East Karawang District has a reduction of ± 92.25 Ha/year.

Farmers' Perspectives on Several Indicators of Paddy Field Conversion

The farmer's perspective regarding several indicators in the conversion of their paddy fields here is aimed to discover/assess the farmers' perception/opinion as landlords/landowners on the driving, controlling, and decision-making indicators in changing the use/utilization of paddy fields to non-paddy fields. The extent of the farmer's point of view is reflected in the results of the weighted score calculation derived from the perceived value of each indicator used in this study. This means that the higher the indicator weighted score, the greater the influence is on the process of converting paddy fields so that it will determine the choices of the farmers as owners of paddy fields which are considered more profitable in managing their use/utilization.

Table 1
Conversion of Paddy Fields in West Teluk Jambe District and East Karawang District

District	Area	Paddy Field Area in Karawang Regency						
		2014	2015	2016	2017	2018	Changes in 2014-2018	
	ha	ha	ha	ha	ha	ha	ha/Year	%/Year
West Teluk Jambe	7,336	2,260	2,060	2,060	2,091	2,039	-55.25	-2.44
East Karawang	2,977	1,464	1,437	1,173	1,173	1,095	-92.25	-6.30

Source: Processed data, 2020

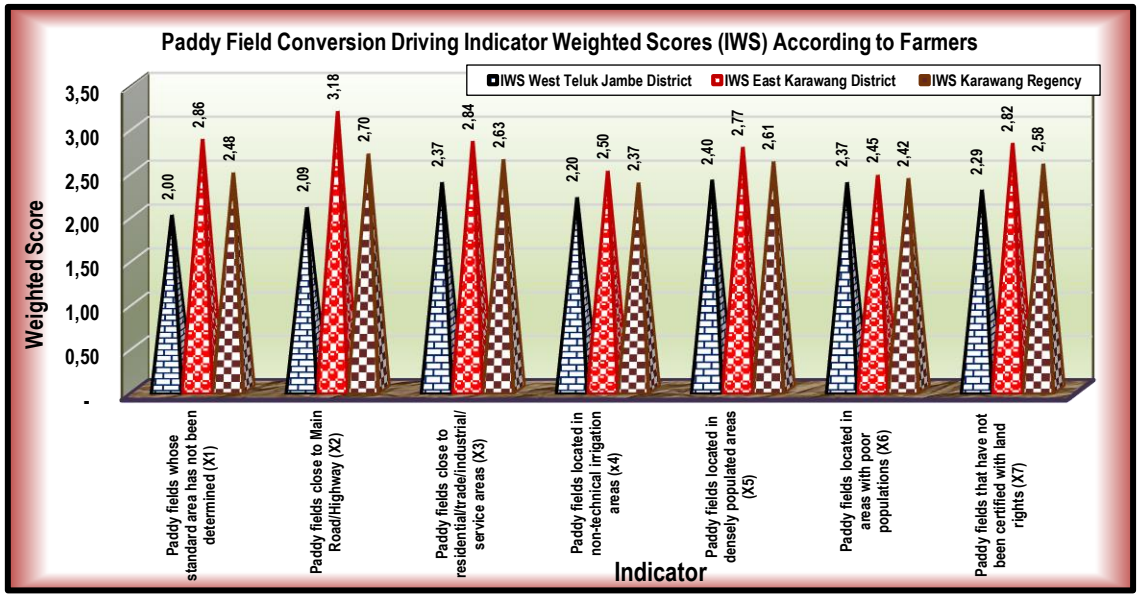

Figure 1
Paddy Field Conversion Driving Indicator Weighted Scores

Farmers' Perspectives on the Driving Indicators for the Conversion of Paddy Fields

The farmer's perspective on several driving indicators for the conversion of paddy fields in this study calculated the weighted score for each driving indicator item as the cause of change in the use/utilization of paddy fields. This study uses seven driving indicators as the focus for observation: 1) paddy fields whose standard area has not been determined, 2) paddy fields close to main roads/highways, 3) paddy fields close to residential/trade/industrial/service areas, 4) paddy fields located in non-technical irrigated areas, 5) paddy fields located in densely populated areas, 6) paddy fields located in poor population areas, and 7) paddy fields that have not been land-right certified. Based on the

seven driving indicators, farmer respondents were asked to respond/give their opinion to assess according to the level of their perception.

The results of the collection and analysis of field data obtained from observations and opinions/responses of farmer respondents (n=79) on several driving indicators that cause vulnerability/easiness in the process of conversion of paddy fields. Of the seven driving indicators asked to the farmer respondents, the results of the calculation of the weighted score are as shown in Figure 1. West Teluk Jambe District is a sample location for the district relatively far from the Karawang Regency Government Center. As can be seen in Table 2, of the seven driving indicators asked to farmer respondents (n=35), the calculation results showed that there are three indicators with the highest level of vulnerability to drive farmers to convert their paddy fields, starting from the highest which is the indicator of paddy fields located in densely populated areas at 2.40, followed by indicators of paddy fields being close to the location of residential/trade/industrial/ service areas (2.37), and paddy fields located in low-income population areas (2.37). On the other hand, there are three indicators with the lowest level of vulnerability, starting from the lowest weighted score, which is the indicator for paddy fields whose standard area has not been set at 2.00, followed by indicators for paddy fields being close to main roads/highways (2.09), and indicators for paddy fields located in non-technical irrigation areas (2.20).

Table 2
Paddy Field Conversion Driving Indicator Weighted scores in West Teluk Jambe District

No.	Paddy Fields Conversion Driving Indicators	West Teluk Jambe District Farmer Respondents					
		Perception/Response (n = 35)					Indicator Weighted Score
		D	SD	A	AM	SA	Score
		1	2	3	4	5	
1.	The standard paddy field area has not been determined (X1)	12	11	12	0	0	2.00
2.	Distance from main road/highway (X2)	13	8	13	0	1	2.09
3.	Distance from residential/trade/industrial/service areas (X3)	10	6	17	0	2	2.37
4.	Paddy field located in non-technical irrigation area (X4)	10	10	14	0	1	2.20
5.	Paddy field located in a densely populated area (X5)	6	9	20	0	0	2.40
6.	Paddy field located in poor population area (X6)	7	12	14	0	2	2.37
7.	Not yet land-right certified (X7)	7	12	15	1	0	2.29

Note: D (Disagree); SD (Slightly Disagree); A (Agree); AM (Agree More); SA (Strongly Agree)
Source: Processed data, 2020

From all the results of the weighted score calculation, the driving indicators in West Teluk Jambe District above are within the category between 1.00-2.60. This means that according to respondents' perceptions/assessments, the seven driving indicators used did not have a major impact and do not strongly act as the driving factors for the conversion of paddy fields by farmers in the West Teluk Jambe District.

In contrast to West Teluk Jambe District, East Karawang District is a sample location for districts relatively close to the Karawang Regency Government Center. Of the seven driving indicators asked to farmer respondents (n=44), most of their weighted scores fell into the category

between > 2.60-5.00, meaning that they are sufficient to encourage land conversion.

Based on the weighted score category which was between > 2.60-5.00, the results of the weighted score calculation (Table 3) in this region showed that there were three indicators with the highest level of vulnerability to encourage the conversion of paddy fields by farmers, starting from the highest, which is the indicator of paddy fields close to the main road/highway at 3.16, followed by the indicator of paddy fields whose standard area has not been determined (2.86), and the indicator of paddy fields close to the location of residential/trade/industrial/ service areas (2.84). Meanwhile, two indicators with the lowest level of vulnerability to the conversion of paddy fields in the weighted score category at 1.00-2.60 were paddy fields located in low-income areas of 2.45 which was the lowest, followed by paddy fields located in non-technical irrigation areas (2.59).

Table 3
Paddy Field Conversion Driving Indicator Weighted Scores in East Karawang District

No.	Paddy Field Conversion Driving Indicators	East Karawang Farmer Respondents					
		Perception/Response (n = 44)					Indicator Weighted Score
		D	SD	A	AM	SA	Score
		1	2	3	4	5	
1.	The standard paddy field area has not been determined (X1)	4	8	25	4	3	2.86
2.	Distance from main road/highway (X2)	1	7	26	4	6	3.16
3.	Distance from residential/trade/industrial/service areas (X3)	4	11	22	2	5	2.84
4.	Paddy field located in non-technical irrigation area (X4)	4	18	14	8	0	2.59
5.	Paddy field located in a densely populated area (X5)	4	14	16	8	2	2.77
6.	Paddy field located in poor population area (X6)	5	19	16	3	1	2.45
7.	Not yet land-right certified (X7)	3	13	21	3	4	2.82

Note: D (Disagree); SD (Slightly Disagree); A (Agree); AM (Agree More); SA (Strongly Agree)
Source: Processed data, 2020

To further discern the difference in the value of weighted score on indicators that encourage land use change between areas near and far from the center of government, an independent sample T-Test was conducted. After a normality test, the Sig. (2-tailed) value was found to be less than 0.05 (Table 4). Therefore, it can be interpreted that there are differences between the driving indicators of land conversion in areas far and near to the center of government. If perused, the weighted score in Tables 2 and 3 showed that in areas closer to the center of government, land conversion is more likely than in areas far from the center of government based on the perception of the local farming community.

Table 4
Independent Test Results Sample T – Test Score Driving Indicator Weighted score of the Conversion of Paddy Fields

Description	T – Test Score
t	-5.236
df	12
Sig. (2-tailed)	0,000

Source: Processed data, 2022

The results of the weighted score calculation at the Karawang Regency level were a combination of 2 sample district locations, West Teluk Jambe District and East Karawang District (Table 5). Of the seven driving indicators asked to the farmer respondents, the calculation results of the scoring value showed that there were three indicators with the highest level of vulnerability in driving the conversion of paddy fields by farmers with the weighted score category between > 2.60 - 5.00. The three indicators that fell into this category with the highest weighted score were the indicator of paddy fields being close to main roads/highways at 2.68, followed by the indicator of paddy fields being close to residential/trade/industrial/service areas (2.63), and the indicator of paddy fields located in a densely populated area (2.61).

Table 5
Driving Indicator Weighted Score of the Conversion of Paddy Fields in Karawang Regency

No.	Paddy Field Conversion Driving Indicators	Karawang Regency Farmer Respondents					
		Perception/Response (n = 79)					Indicator Weighted Score
		D	SD	A	AM	SA	Score
		1	2	3	4	5	
1.	The standard paddy field area has not been determined (X1)	16	19	37	4	3	2.48
2.	Distance from main road/highway (X2)	14	15	39	4	7	2.68
3.	Distance from residential/trade/industrial/service areas (X3)	14	17	39	2	7	2.63
4.	Paddy field located in non-technical irrigation area (X4)	14	28	28	8	1	2.42
5.	Paddy field located in a densely populated area (X5)	10	23	36	8	2	2.61
6.	Paddy field located in poor population area (X6)	12	31	30	3	3	2.42
7.	Not yet land-right certified (X7)	10	25	36	4	4	2.58

Note: D (Disagree); SD (Slightly Disagree); A (Agree); AM (Agree More); SA (Strongly Agree)
Source: Processed data, 2020

Meanwhile, there were three indicators with the lowest level of vulnerability in the weighted score category between 1.00-2.60, starting from the lowest score, the indicator of paddy fields located in non-technical irrigation areas, and the indicator of paddy fields located in areas with a low-income population with the same weighted score of 2.42, as well as indicators of paddy fields whose standard area has not been determined (2.48).

Based on the calculation results of the weighted score of the 7 driving indicators that have been stated above, it can be seen that although the impact of these driving factors was not huge according to the perception of the farmers in West Teluk Jambe District which is located relatively far from the Government Center in converting their paddy fields, for farmers in East Karawang District, which is located relatively close to the Central Government, it had a significant influence in encouraging the conversion of paddy fields. Some of the indicators that need better management so that the existence of paddy fields can be maintained in Karawang Regency and other areas are as follows:

a. Paddy fields close to the main road (highway/toll road) are more vulnerable, sensitive, and susceptible to conversion to non-paddy fields.
b. Paddy fields close to residential, trade, industrial, and service areas are more vulnerable, sensitive, and susceptible to conversion to non-paddy fields.

c. Paddy fields located in densely populated areas are more vulnerable, sensitive, and susceptible to conversion to non-paddy fields.

These results are in line with research by Kaswanto et al., (2021) that the factors that influence changes are geographical factors, population factors and distance from the sub-district center and main roads. Similarly, research results found in China, that industrial development affects land use change in China either through direct impacts of economic activities such as oil exploration and agricultural production, or through indirect impacts such as readjustment of industrial structure (Peng et al., 2010; Su, Changhong et al., 2011). The increase in demand for land due to population growth affects the conversion of agricultural land to non-agricultural land (Kusrini et al., 2011). The increasing number of industrial sectors has an impact on the increasing number of land functions, where the increase in the number of industries encourages an increase in land demand, resulting in the conversion of land use to non-agricultural (Pondaag et al., 2018).

Farmers' Perspectives on Controlling Indicators for the Conversion of Paddy Fields

Efforts to prevent and control the conversion of paddy fields can be done using various methods and treatments. In addition to preventing and suppressing the various driving indicators mentioned above, it can be done by increasing the effectiveness of the application of indicators controlling the conversion of paddy fields and making strategic policies in securing the areas of existing, dynamic paddy fields.

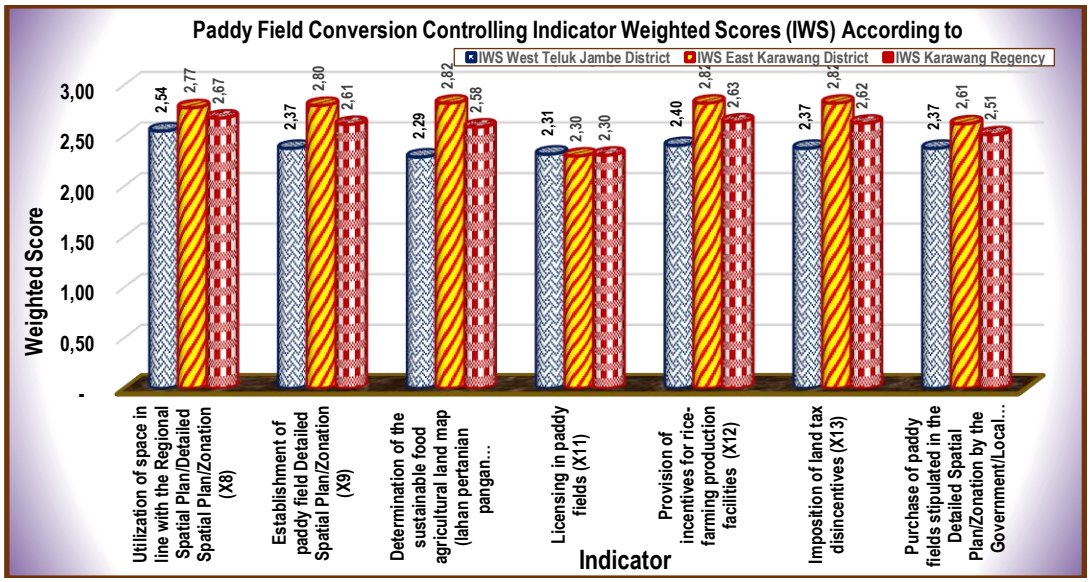

Figure 2
Controlling Indicator Weighted Score of the Conversion of Paddy Fields

Observations on controlling factors to prevent/thwart the conversion of paddy fields in this study were focused on the observation of seven control indicators: 1) utilization of space that is in line with Regional Spatial Plan/Detailed Spatial Plan/Zonation, 2) establishment of paddy field Detailed Spatial Plan/Zonation, 3) determination of sustainable food crop agricultural land maps (LP2B) for paddy fields, 4) granting of permits on paddy fields, 5) providing incentives for rice farming production facilities (seeds/seedlings, fertilizers, pesticides, *et cetera*.), 6) imposition of high land taxes on the sale and purchase/transfer of land rights which cause changes in the use of paddy fields, and 7) purchase of paddy fields that have been stipulated in the Detailed Spatial Plan/Zonation/LP2B by

the Government/Local Government. Based on these seven driving indicators, farmer respondents were asked to respond/give their assessment opinion according to their level of perception.

The results of the collection and analysis of field data obtained from observations and the opinions/responses of farmer respondents (n=79) on several controlling indicators to prevent/thwart the rate of paddy field conversion. The weighted score of each of the controlling indicators can be seen in Figure 2.

As previously mentioned, West Teluk Jambe District is a sample location far from the district government center. However, none of the seven control indicators used to question the farmer respondents (n=35) showed weighted score calculation results (Table 6) within the category between > 2.60 - 5.00.

However, three indicators with weighted scores had the highest level of control to restrain/thwart the conversion of paddy fields by farmers. The highest weighted score was the indicator of space utilization which is in line with the Regional Spatial Plan/Detailed Spatial Plan/Zonation with a weighted score of 2.54, then followed by the indicator of providing incentives for paddy fields cultivation production facilities (seeds/seedlings, fertilizers, *et cetera*) (2.40), while the indicator of determining paddy field Detailed Spatial Plan/Zonation, the indicator of imposition of land tax disincentives, and the indicator of the purchase of paddy fields stipulated in the LP2B RRTR/Detailed Spatial Plan/Zonation by the Government/Local Government each had indicator weighted scores of 2.

Table 6
Paddy Field Conversion Controlling Indicator Weighted Scores in West Teluk Jambe District

No.	Controlling Indicators of the Conversion of Paddy fields	West Teluk Jambe District Farmer Respondents					
		Perception/Response (n = 35)					Indicator Weighted Score
		D	SD	A	AM	SA	Score
		1	2	3	4	5	
1.	Utilization of space according to the Regional Spatial Plan/Detailed Spatial Plan/Zonation (X8)	6	6	22	0	1	2.54
2.	Establishment of the paddy field RRTR/ Detailed Spatial Plan/Zonation (X9)	7	10	17	0	1	2.37
3.	Determining the paddy field LP2B map (X10)	9	9	16	0	1	2.29
4.	Granting permits in paddy field areas (X11)	7	12	15	0	1	2.31
5.	Providing incentives for rice cultivation (X12)	4	15	15	0	1	2.4
6.	Imposition of land tax disincentive (X13)	3	16	16	0	0	2.37
7.	Purchase of paddy field by the government/regional government (X14)	3	16	16	0	0	2.37

Note: D (Disagree); SD (Slightly Disagree); A (Agree); AM (Agree More); SA (Strongly Agree)
Source: Processed data, 2020

Meanwhile, there were two indicators with the lowest level of reducing/controlling conversion of paddy fields by farmers. The lowest weighted score was the indicator for establishing a sustainable food crop agricultural land map (LP2B) for paddy fields at 2.29, then followed by the indicator for granting permits in paddy field areas (2.31).

From the calculation results of the Weighted scores, all of the controlling indicators in West Teluk Jambe District fell in the category between 1.00-2.60. This means that according to the perception/assessment of the farming community in this area, the seven controlling indicators used have not had a significant influence/impact as a restraining factor to reduce the conversion of paddy fields in West Teluk Jambe District.

The condition of East Karawang District as an area closer to the District Government Center is somewhat different from West Teluk Jambe District, where according to the perception assessment of farmer respondents (n = 44) in East Karawang District, it shows that of the seven control indicators questioned, almost all of the weighted scores (± 85.57 %) were in the category between > 2.60 - 5.00 (Table 7). This indicated that most of the controlling indicators used are effective in preventing/reducing the conversion of paddy fields in the East Karawang District.

Table 7
Controlling Indicator Weighted Scores of the Conversion of Paddy Fields in East Karawang District

No.	Controlling Indicators of the Conversion of Paddy Fields	East Karawang District Farmer Respondents					
		Perception/Response (n = 44)					Indicator Weighted Score
		D	SD	A	AM	SA	Skor
		1	2	3	4	5	
1.	Utilization of space according to the Regional Spatial Plan/Detailed Spatial Plan/Zonation (X8)	3	11	26	1	3	2.77
2.	Establishment of the paddy field Detailed Spatial Plan/Zonation (X9)	1	13	25	4	1	2.8
3.	Determining the paddy field LP2B map (X10)	3	12	20	8	1	2.82
4.	Granting permits in paddy field areas (X11)	8	20	12	3	1	2.3
5.	Providing incentives for rice cultivation (X12)	2	12	24	4	2	2.82
6.	Imposition of land tax disincentive (X13)	2	10	28	2	2	2.82
7.	Purchase of paddy field by the government/regional government (X14)	7	10	22	3	2	2.61

Note: D (Disagree); SD (Slightly Disagree); A (Agree); AM (Agree More); SA (Strongly Agree)
Source: Processed data, 2020

Based on the Weighted score category between > 2.60 - 5.00, the results of the Weighted score count in East Karawang District showed that there were 3 indicators with the highest level of control to prevent/reduce the conversion of paddy fields by farmers, starting from the highest, the indicator for determining the food agricultural land sustainability (LP2B) map of paddy fields, followed by the indicator of providing incentives for paddy farming production facilities (seeds/seeds, fertilizers, *et cetera*), and the indicator of the imposition of land tax disincentives; all these had Weighted scores of 2.82. In addition, there was 1 indicator with the lowest level of control with the weighted score category between 1.00-2.60, the indicator of granting permits in paddy fields, with a weighted score of 2.30.

To further understand the difference in the value of weighted scores on indicators controlling land use change between areas near and far from the center of government, the independent sample T-Test was conducted. After the normality

test, the Sig. (2-tailed) value was found to be less than 0.05 (Table 8). Therefore, it can be interpreted that there are differences between indicators controlling land conversion in areas far and near the center of government. If the weighted score in Tables 6 and 7 are studied closely, it can be seen that areas closer to the center of government were more able to control the conversion of land functions than areas far from the center of government based on the perception of the local farming community.

Table 8
Sample T – Test Independent Test Results for Controlling Indicator Weighted Scores of the Conversion of Paddy fields

Description	T – Test Score
T	-4.117
Df	12
Sig. (2-tailed)	0,001

Source: Processed data, 2022

From the combination of two sample district locations, the results of the weighted score calculation of the controlling indicators at the Karawang Regency level in Table 9 show that of the seven indicators asked to farmer respondents, there were three indicators with the highest scoring scores in the category between > 2.60 - 5.00, ranging from the highest weighted score, the indicator of space utilization in line with the Regional Spatial Plan/Detailed Spatial Plan/Zonation of 2.67, followed by the indicator of providing incentives for paddy farming production facilities (seeds/seedlings, fertilizers, *et cetera.)* (2.63), and the indicator of the imposition of land disincentives taxes (2.62). On the other hand, one indicator with the lowest level of control fell into the weighted score category between 1.00-2.60, the indicator of granting permits in paddy fields with a weighted score of 2.30.

Table 9
Controlling Indicator Weighted Score of the Conversion of Paddy Fields in Karawang Regency

No.	Controlling Indicators of the Conversion of Paddy Fields	Karawang Regency Farmer Respondents					
		Perception/Response (n = 79)					Indicator Weighted Score
		D	SD	A	AM	SA	Score
		1	2	3	4	5	
1.	Utilization of space according to the Regional Spatial Plan/Detailed Spatial Plan/Zonation (X8)	3	11	26	1	3	2.77
2.	Establishment of the paddy field Detailed Spatial Plan/Zonation (X9)	1	13	25	4	1	2.8
3.	Determining the paddy field LP2B map (X10)	3	12	20	8	1	2.82
4.	Granting permits in paddy field areas (X11)	8	20	12	3	1	2.3
5.	Providing incentives for rice cultivation (X12)	2	12	24	4	2	2.82
6.	Imposition of land tax disincentive (X13)	2	10	28	2	2	2.82
7.	Purchase of paddy field by the government/regional government (X14)	7	10	22	3	2	2.61

Note: D (Disagree); SD (Slightly Disagree); A (Agree); AM (Agree More); SA (Strongly Agree)
Source: Processed data, 2020

From the calculation results of the seven weighted score controlling indicators, it can be seen that although the regulatory/reduction impact of these controlling factors was significant according to the perception of farmer respondents in West Teluk Jambe District which is located quite far from the Government Center in the conversion of their paddy fields; however, for farmers in East Karawang District, which is near the Government Center, and generally, in Karawang Regency, these controlling factors had a significant influence in controlling/reducing the process of paddy field conversion by farmers:

a. providing incentives for paddy farming production facilities such as seeds/seedlings, fertilizers, pesticides, and so on can control the conversion of paddy fields;
b. imposition of a high land tax on the sale and purchase/transfer of land rights that cause changes in the use of paddy fields can control the conversion of paddy fields;
c. spatial utilization that is in line with the Regional Spatial Plan, Detailed Spatial Plan, or zonation can control the conversion of paddy fields;
d. establishment of a sustainable food agricultural land map (LP2B) for paddy fields can control the conversion of paddy fields.

The factors mentioned above focus on policy factors in order to control agricultural land. Land use change control needs to involve stakeholders, including the community, both from the aspects of planning, implementation, supervision and control, and synchronization with laws and regulations (Iqbal & Sumaryanto, 2016). In line with that, Sriartha & Windia (2015) found that policy implementation in controlling rice field conversion has not run effectively due to weak regulations, weak supervision and control, and lack of public participation. In line with agricultural conditions in Europe, agricultural land conversion results not only from the physical, and socio-economic environment, but most importantly policy setting (Ustaoglu & Williams, 2017).

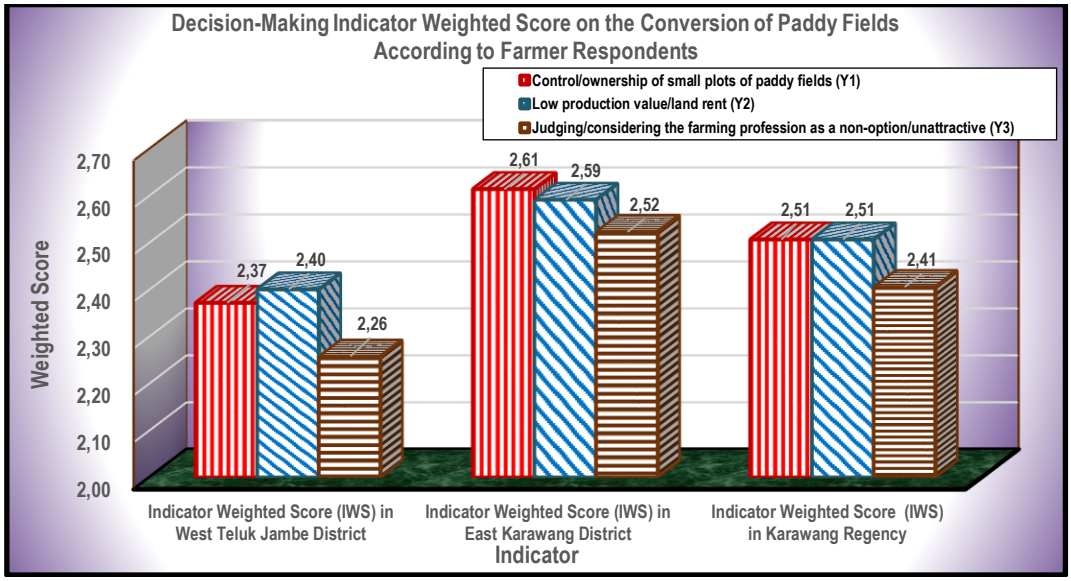

Figure 3
Decision-Making Indicator Weighted Score on the Conversion of Paddy fields

Farmers' Perspectives on Decision-Making Indicators on the Conversion of Paddy fields

Observations on the farmer's perspective on the decision-making factors that are considered decisive in their choice for converting their paddy fields in this study were focused on three indicators: 1) control/ownership of a small paddy field, 2) low production value/land rent of paddy

fields, and 3) judging/considering the farming profession as a non-option/unattractive. Next, farmer respondents were asked to respond/give their opinion to assess the three decision-making indicators according to their perception. This was then used to calculate the weighted score of each item

The results of the collection and analysis of field data obtained from farmer respondents (n = 79) regarding the three decision-making indicators of the conversion of paddy fields in detail for each indicator can be seen in Figure 4.

The calculation results of the decision-making Indicator weighted score based on the perception of farmer respondents (n=35) in West Teluk Jambe District (Table 10) show that of the three indicators used, the results of the calculation that determine the choice of farmers to convert their paddy fields to non-paddy fields with the highest indicator weighted score was the control/ownership of a small paddy field with a weighted score of 2.37, followed by the indicator of low land rent/production value (2.34), and the indicator of judging/regarding the farming profession as a non-option/unattractive (2.26).

However, the results of the weighted score calculation of the three decision-making indicators in West Teluk Jambe District were still low and fell in the category between 1.00-2.60. This means that although the scores of all the decision-making indicators on the conversion of paddy fields by the farming community were relatively low and were considered significant in determining their choice, this could already indicate their decision choices.

Table 10
Decision-Making Indicator Weighted Score on the Conversion of Paddy Fields in West Teluk Jambe District

No.	Decision-Making Indicator on the Conversion of Paddy Fields	West Teluk Jambe District Farmer Respondents					
		Perception/Response (n = 35)					Indicator Weighted Score
		D	SD	A	AM	SA	Score
		1	2	3	4	5	
1.	Control/ownership of a small paddy field (X15)	4	14	17	0	0	2.37
2.	A low paddy field production/land rent (X16)	4	15	16	0	0	2.34
3.	The farming profession is a non-option/unattractive (X17)	6	16	12	0	1	2.26

Note: D (Disagree); SD (Slightly Disagree); A (Agree); AM (Agree More); SA (Strongly Agree)
Source: Processed data, 2020

Showing a similar pattern to West Teluk Jambe District, according to the perception of the farming community (n=44) in East Karawang District which is located near the district government center (Table 11), of the three indicators, the one that showed the most decisive results in farmers' choice of converting their paddy fields to non-paddy fields with the highest weighted score was the indicator of control/ownership of small paddy fields with a weighted score of 2.61, followed by the indicator of low production value/land rent of paddy fields (2.59), and the indicator of judging/considering the farming profession as a non-option/unattractive (2.52).

Based on the weighted score category between > 2.60 - 5.00, from the results of the weighted score calculation in East Karawang District, there was one decision-making indicator that was the most significant in determining the farmers' choice to convert their paddy fields, the indicator of control/ownership of a small paddy field. This means that the small paddy fields when cultivated for rice farming are no longer able to fulfill the needs of their family, so they have to be converted and/or sold to obtain capital for

other businesses. In addition, the two decision-making indicators with a weighted score of 2.60 indicated that the farming community feels the consequences of the small areas of paddy fields reducing the production value/land rent and thus being insufficient for their needs.

Table 11
Decision-Making Indicator Weighted Score on the Conversion of Paddy Fields in East Karawang District

No.	Decision-Making Indicator on the Conversion of Paddy Fields	East Karawang Farmer Respondents					
		Perception/Response (n = 44)					Indicator Weighted Score
		D	SD	A	AM	SA	Score
		1	2	3	4	5	
1.	Control/ownership of a small paddy field (X15)	5	7	32	0	0	2.61
2.	A low paddy field production/land rent (X16)	8	7	25	3	1	2.59
3.	The farming profession is a non-option/unattractive (X17)	6	14	21	1	2	2.52

Note: D (Disagree); SD (Slightly Disagree); A (Agree); AM (Agree More); SA (Strongly Agree)
Source: Processed data, 2020

To further understand the differences in the weighted scores on land-use change controlling indicators between areas near and far from the center of government, an independent sample T-Test was conducted. After the normality test was carried out, the Sig. (2-tailed) value was found to be less than 0.05 (Table 12). Therefore, it can be interpreted that there are differences between indicators controlling land conversion in areas far and near the center of government. When the weighted score in Tables 10 and 11 are studied closely, it is apparent that areas closer to the center of government were more able to control the conversion of land functions than areas far from the center of government based on the perception of the local farming community.

Table 12
Independent Sample T-Test Results for Decision-Making Indicator Weighted Scores on the Conversion of Paddy Fields

Description	T – Test Score
t	-5.857
df	4
Sig. (2-tailed)	0,004

Source: Processed data, 2022

The calculation results of the decision-making indicator weighted scores for the Karawang Regency level as a combination of 2 sample districts, West Teluk Jambe District and East Karawang District, showed almost the same results as the indicator weighted scores in West Teluk Jambe District, the weighted score for the three decision-making indicators being in the category between 1.00 - 2.60.

Of the three indicators that were asked to the farmer respondents, the indicator with the highest weighted score that drove farmers to choose to convert their paddy fields was the indicator of control/ownership of a small paddy field with a weighted score of 2.51, followed by the indicator of low production value/land rent of paddy fields (2.48), and the indicator of judging/considering the farming profession as a non-option/unattractive (2.41).

From the calculation results of the three decision-making indicator weighted

scores stated above, it can be seen that most of the decision-making indicators in determining the choice to convert their paddy fields were not significant, except for one indicator that was a significant choice for farmers in East Karawang District which is near the Government Center: the indicator of control/ownership of a small paddy field.

Although the farmers' choices on the decision-making indicators were not significant, these three indicators had a consistent sequence in the weighted score calculation results of the people's choices in converting their paddy fields, from the highest to the lowest score, as follows:

a. The control/ownership of a small paddy field makes them more vulnerable/sensitive/susceptible in making choices regarding the decision to transfer function to non-paddy fields
b. Low paddy field production value/land rent makes them more vulnerable/sensitive/susceptible in making choices regarding the decision to convert to non-paddy fields.
c. Judging/considering the farming profession as a non-option / unattractive leads to more vulnerability/sensitivity/ease in making choices regarding the decision to convert to non-paddy fields.

Table 13
Decision-Making Indicator Weighted Score on the Conversion of Paddy Fields in Karawang Regency

No.	Decision-Making Indicator on the Conversion of Paddy Fields	Karawang Regency Farmer Respondents					
		Perception/Response (n = 79)					Indicator Weighted Score
		D	SD	A	AM	SA	Score
		1	2	3	4	5	
1.	Control/ownership of a small paddy field (X15)	9	21	49	0	0	2.51
2.	A low paddy field production/land rent (X16)	12	22	41	3	1	2.48
3.	The farming profession is a non-option/unattractive (X17)	12	30	33	1	3	2.41

Note: D (Disagree); SD (Slightly Disagree); A (Agree); AM (Agree More); SA (Strongly Agree)
Source: Processed data, 2020

One of the determining factors for the welfare of farmers is adequate ownership of agricultural land (Musrifin & Buana, 2019). The narrow area of land ownership results in agricultural results that are not able to meet the needs of farmers, so farmers choose to switch to other jobs and convert and even sell their rice fields. The low production value of rice fields faced with high land selling prices will fertilize land use conversion practices. As research Arvianti & Abin (2018), farmers who no longer want to do farming are tempted to sell their land. The hope for further food security then rests on young farmers who consider farmers' work to be an attractive job. However, the enthusiasm of young farmers to engage in agribusiness must be proportional to their income level. If the income level of young farmers increases, then the practice of land use conversion will decrease (Arvianti & Abin, 2018).

CONCLUSION

The combined perspective of farmers at the Karawang Regency level showed there are three indicators with the highest level of vulnerability and their influence to encourage the conversion of their paddy fields from the highest: 1) indicators of paddy fields being close to main roads/highways, 2) indicators of paddy fields being close to the location of residential/trade/industry/services areas, and 3) indicators of paddy fields located in densely populated areas.

The combined perspective of farmers at the Karawang Regency level showed there are three indicators with the highest level of control to restrain/restrict

the conversion of paddy fields starting from the largest: 1) indicators of space utilization in line with Regional Spatial Plan/Detailed Spatial Plan/Zonation, 2) indicators of providing incentives for paddy farming production facilities (seeds/seedlings, fertilizers, *et cetera*), and 3) indicators for the imposition of land tax disincentives.

The combined perspective of farmers at the Karawang Regency level regarding 3 decision-making indicators for converting paddy fields that most strongly determined their choices starting from the highest are: 1) the indicator of control/ownership of a small paddy field, 2) the indicator of low paddy field production value/land rent, and 3) the indicator of judging/considering the farming profession as a non-option/unattractive.

In areas near and far from the center of government, the farming communities have differing perspectives regarding land conversion. Farming communities in areas close to the center of government are more likely to encourage, make the decision, and control land use change compared to those far from the center of government. Thus, efforts to control land use change can be more effectively carried out starting from areas close to the center of government.

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