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Spatial-Based Space Designation Factor Analysis of Rice Fields Conversion (Case Study: West Java Province)

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Abstract

Regional economic development in the concept of spatial planning is based on cultivation areas, including the allocation of production forests, agriculture, mining, settlements, industry, tourism and trade. Economic development in rural areas is not only to improve welfare but also to fulfill food (rice) needs. One of the benchmarks for the level of welfare is the Gross Regional Domestic Product (GDP). Conversion of agricultural land into built-up land is a mechanism for regional economic development activities, where to increase GDP, allocate the widest possible allocation of industrial, trade and residential space which has implications for increasing conversion of agricultural land (rice fields) and reducing rice production facilities so that food fulfillment is constrained, in other words, there is a trade off in the use of agricultural land (rice fields). The purpose of this study was to analyze the distribution and conversion of paddy fields pattern in terms of space designation, road access and land prices, analyze the spatial designation factors affecting paddy field conversion and determine the priority scale of revision of Spatial Planning in terms of the potential for rice field conversion in rural areas. The research location is distinguished in rural areas with high and low industrialization and urbanization. Input data using spatial software with overlay technique and to answer the objectives using quantitative spatial analysis, multiple linear regression analysis and spatial multicriteria analysis of 4 (four) criteria (space allocation, road access, population density and land prices). The results showed that the distribution pattern of paddy fields according to road access was dominant in an area > 3 km from the road, followed by an area of 1-3 km from the road and the lowest in an area of 0-1 km from the road. The distribution of paddy fields according to the spatial designation is dominant with the designation of agricultural space-wetland, while the rice fields with the designation of space-residential, trade, industry is dominant in rural areas with high industrialization and urbanization. Conversion of paddy fields into built-up land is dominant in industrialized and urbanized highly rural areas, in the designation of space-residential, trade, industry and in areas 0-3 km from the road. The allocation of space for paddy fields can have an impact on encouraging or controlling land conversion, where rice fields with the designation of space-residential, trade, industry can encourage land conversion, on the other hand, rice fields with non-residential designation for industrial trade are relatively controllable. Revision of Spatial Planning is recommended in rural areas with relatively high potential for conversion of paddy fields, namely in rural areas with high industrialization and urbanization.

Keywords
multiple linear regression; rice field conversion; road access; spatial designation; spatial multi-criteria analysis

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I. Introduction

The agricultural sector, especially rice fields as natural resources, needs to be optimally arranged in regional economic development planning. In the concept of spatial planning, regional economic development relies on cultivation areas, which include 7 (seven) spatial allocations, namely production forests, agriculture, industry, tourism, mining, settlements and trade. Agricultural development is placed on the allocation of agricultural space. District Spatial Planning (RTRW-K) is an instrument for allocating space for various sector activities in regional development planning. Regional-based development is based on "location theory" with the basic idea of optimizing space utilization through space allocation in such a way that all available space can be utilized optimally for various sector activities. Location theory is a basic theory in spatial analysis where spatial planning and the location of economic activities are the main elements. Capello (2011) says that location theory seeks to explain the distribution of activities in space. Economic development in rural areas is intended to improve community welfare and fulfill basic needs, namely food (rice). The level of welfare of a region can be seen from economic growth, per capita income, Gross Regional Domestic Product (GRDP) and the transformation of the region's economic structure. The transformation of the regional economic structure is illustrated by changes in the sector's contribution in the formation of GRDP based on business fields, where the contribution of the industrial sector is increasing and the contribution of the agricultural sector is decreasing. Development is a systematic and continuous effort made to realize something that is aspired. Development is a change towards improvement. Changes towards improvement require the mobilization of all human resources and reason to realize what is aspired. In addition, development is also very dependent on the availability of natural resource wealth. The availability of natural resources is one of the keys to economic growth in an area. (Shah, M. et al. 2020). This has implications for increased conversion of agricultural land (rice fields), because the land conversion mechanism is based on land rent, where land use with a land rent value will displace land uses with a land rent smaller “Industrial” land use has the land rent value, followed by “trade, settlement, intensive agriculture, extensive agriculture”. Conversion of agricultural land into built-up land is a common mechanism in regional economic development.

On the other hand, to increase economic growth, deregulation that could attract domestic and foreign investment in manufacturing, trade and real estate so that foreign capital flows in. The policy taken is to allocate industrial space and settlement development on a large scale, which significantly changes land use in the suburbs (Firman, 2000; Spreitzhofer, 2005; Spreitzhofer & Heintel, 2000). The development of industrial areas, road infrastructure and new settlements and cities has an impact on high urbanization due to the availability of new jobs, and the population becomes concentrated in settlements around industrial areas and around roads for several reasons, such as having better accessibility and minimizing transportation costs (Rustiadi et al., 2021).

Meanwhile, Hudailah and Woltjer (2007) argue that the involvement of the private sector in the development of road infrastructure, new cities and industrial estates is generally due to the influence of policy regulations related to spatial planning and development. The regulation provides a policy that the use of space for development activities refers to the suitability of space utilization activities (KKPR) based on the spatial planning (RTR) as regulated in the Law. 26/2007 and PP. 15/2010 Jo. PP. 21/2021. Opportunities for conversion of agricultural land (rice fields) can be controlled through the arrangement of spatial designation patterns, where for paddy fields with the allotment of

"wetland agriculture" the opportunity for land conversion is relatively low compared to rice fields with the allotment of "residential, trade and industrial" space. On the other hand, the arrangement of the pattern of spatial designation (zoning) also affects the value or price of land, where agricultural zoning can reduce the value/price of land.

In an effort to optimize the spatial designation of agricultural land (rice fields) it is necessary to conduct research to analyze the distribution pattern and conversion of paddy fields in terms of space allocation, road access, and land prices, analyze the factors of space allocation, road access, land prices and population density affecting conversion paddy fields and determine the priority scale for the revision of the RTR in terms of the potential for conversion of paddy fields in rural areas based on the level of industrialization and urbanization of the region. The hypotheses built in this study are: (1) the opportunity for conversion of paddy fields in industrialized and high urbanized rural areas is relatively greater than in low industrialized and urbanized rural areas; (2) the higher the paddy field with the designation of space-residential, trade, industry (PR-PPI) the higher the chance of land conversion and vice versa the higher the rice field with the allotment of space-non-residential, trade, industry (PR-NPPI) the chance of conversion paddy fields are getting lower; (3) conversion of paddy fields is inversely proportional to land prices; and (4) rice field conversion is directly proportional to population density.

II. Research Method

Time and Place of Research. The research was conducted in Bekasi Regency, Bogor Regency, Sukabumi Regency and Tasikmalaya Regency, West Java Province. The research was conducted from July to December 2020.

Research Location. The research location is in West Java Province, which is a province with an economic growth rate and GRDP higher than the national average, and the contribution of the dominant industrial sector. West Java Province is geographically directly adjacent to DKI Jakarta Province, has the largest population compared to other provinces in Indonesia. In the last two decades, the province of West Java has carried out massive regional development activities so that the conversion of agricultural land into built-up land in various sectors, namely infrastructure (roads, toll roads, airports, ports, dams), industry, housing, trade/services that require land is something that needs to be done. reasonable. The research locations are located in rural areas (districts) which are differentiated based on the level of industrialization and urbanization of the region, with the indicators: GRDP, the percentage of the manufacturing industry sector's contribution to GRDP, and the percentage of labor in the agricultural sector, population and population density (Table 2.1). The rural areas of high industrialization and urbanization are represented by Bekasi Regency and Bogor Regency, while the rural areas of low industrialization and urbanization are represented by Sukabumi Regency and Tasikmalaya Regency.

III. Result and Discussion

3.1 Distribution of paddy fields and conversion of paddy fields

The results of spatial analysis and quantitative calculations at the research location show that the area of paddy fields in 2013 in industrialized and highly urbanized rural areas, namely Bekasi Regency and Bogor Regency, were 74,403 ha and 57,170 ha respectively, while in industrialized villages and low urbanization, namely Sukabumi Regency and Tasikmalaya Regency, each covering an area of 68,334 ha and an area of

54,544 ha respectively. While the conversion of paddy fields for the 2013-2018 period in industrialized and high-urbanized rural areas (Bogor and Bekasi districts) reached thousands of hectares, while in low-industrialized and urbanized villages (Sukabumi and Tasikmalaya districts) it reached tens/hundreds of hectares, there is a significant difference in the amount of conversion. paddy fields based on the level of industrialization and urbanization of the region. The conversion of paddy fields mostly turned into built-up land, namely settlements/housing and industry/services covering an area of 2,692 ha (57.57%), then non-rice field agriculture (dry fields/mixed gardens) of 1,484 ha (31.72%). This can be explained that in rural areas with high industrialization and high urbanization the value of GRDP is also relatively high and in line with Wijanarko *et al* (2006) that conversion of agricultural land in areas of high regional economic growth cannot be avoided. According to Irawan (2005), areas with high economic growth rates (industrialization and high urbanization) tend to encourage land demand for non-agricultural sector activities (industry, trade and settlements) at a higher level than land demand for agricultural sector activities, non-agricultural sector products are *elastic* to income. Population growth has led to an increase in the need for housing and consumption of non-agricultural products, thereby encouraging land conversion. Along with the development of industrial and residential areas, access to these locations is getting better, thus encouraging increased demand for land. The industrial sector is often used as a benchmark for the progress of a country/region's economic development, the higher the contribution of the industrial sector in the economy, the more advanced the development of its economic development (Sastrosoenarto, 2006).

Table 1. The area of paddy fields converted into built-up land and non-paddy agriculture for the period 2013-2018 at the research site

Location / Regency	area Rice field	area 2013-2018 converted to				Total conversion (Ha)	% conversion to
		industrial rice field area/ services	/ housing	agriculture Non-rice field	Other		
Bekasi	74,403	116	1,092	13	121	1,343	1.80
Bogor	57,170	64	1,329	1,269	339	3,001	5,24
Sukabumi	68,334	12	40	199	37	288	0.42
Tasikmalaya	54,544	15	24	2	3	45	0.08
Total (Ha)		206	2,486	1,484	501	4,677	
%		4.41	53.16	31.72	10.71	100.00	

Source: results processing of spatial data on land use in 2018 and 2013

a. The distribution pattern of paddy fields and conversion of paddy fields according to road access

The pattern of distribution of paddy fields in 2013 on road access (Figure 3.1), shows the same pattern in both high and low industrialized rural areas and urbanization, where the presence of paddy fields according to road access is dominant in the area > 3 km from the road, followed by an area of 1-3 km from the road and the lowest in the area 0-1 km from the road. This indicates that the presence of paddy fields in rural areas is mostly in the area > 3 km from the road, spatially shown in the brown area (Figure 3.2). The spatial distribution pattern of paddy fields can be divided into 2 clusters, namely the Bekasi Regency cluster with a fairly massive distribution on the north side and the Bogor, Sukabumi and Tasikmalaya regency clusters whose distribution is relatively spread over all areas with less massive expanses.

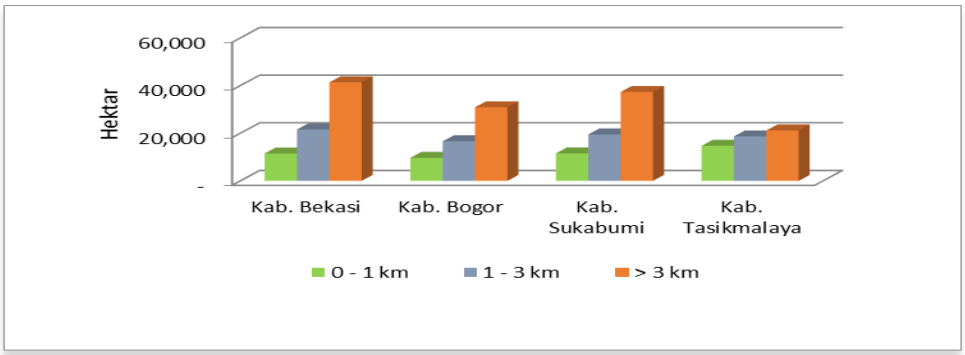


Figure 1. *Pattern of rice field distribution in 2013 by road access*

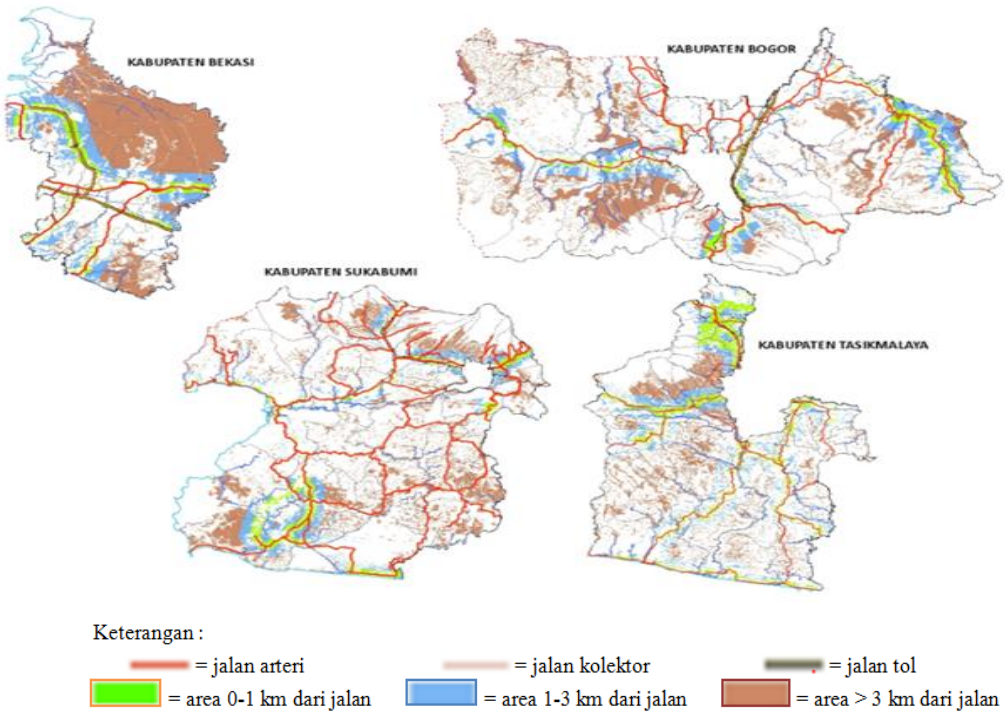


Figure 2. *Spatial distribution of rice fields in 2013 by road access*

The pattern of rice field conversion for the period 2013-2018 by road access is illustrated in a bar chart (Figure 3.3), where rice field conversion is relatively high in industrialized villages and urbanization is high compared to rural areas with low industrialization and urbanization. Conversion of paddy fields is dominant in an area of 0-3 km from the road, this condition is in line with Basuki *et al* (2017), the proximity of paddy fields to road access is a factor causing paddy field conversion, including population density, the growth of economic centers, facilities and infrastructure. land transportation infrastructure. According to Dewi (2010) the main factor causing the conversion of paddy fields is adequate facilities and infrastructure (*accessibility*) such as the road network. Conversion of paddy fields in Bogor Regency is relatively high in an area > 3 km from the road, this is due to the presence of paddy fields in an area > 3 km from the main road scattered with non-massive expanses and relatively small polygon area making it easier to convert.

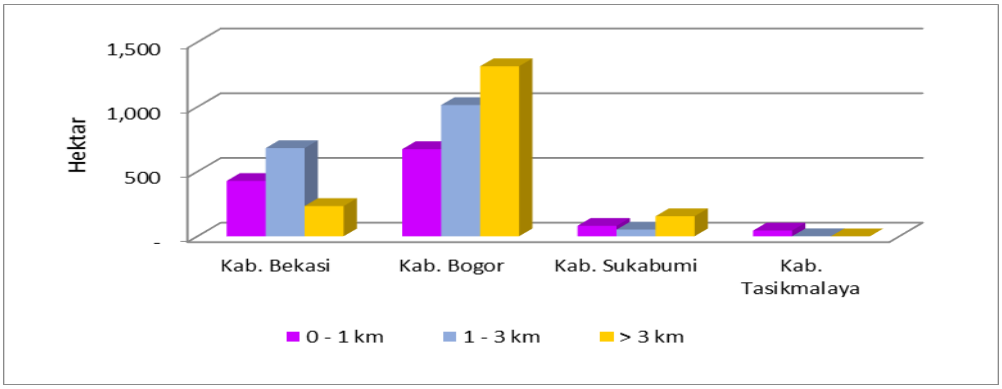
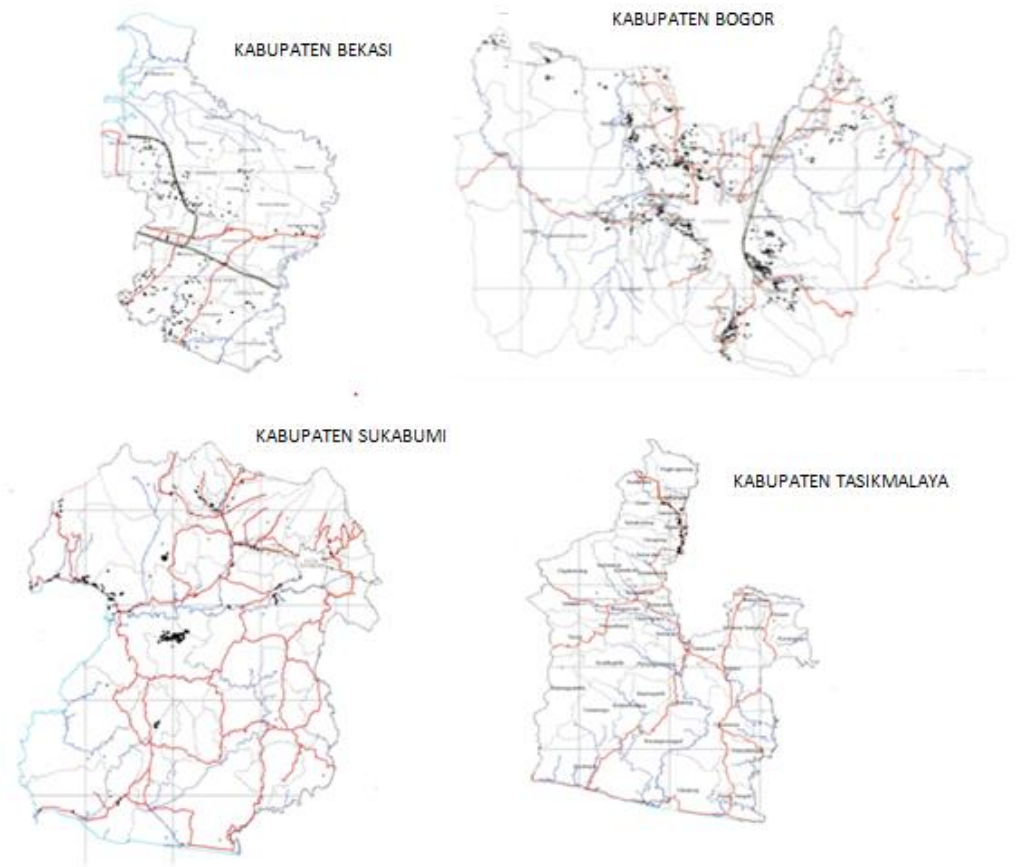


***Figure 3**. Pattern of rice field conversion for the period 2013-2018 by road access*



Source: Sukiptiyah, 2021

***Figure 4.** Distribution pattern of rice field conversion for the period 2013-2018 by road access*

The spatial pattern of rice field conversion to road access (Figure 3.4) shows both in industrialized and rural areas. high and low urbanization, spread following/along the main road, where in Bogor Regency it leads to near/around/outskirts of Bogor City, leads to Jakarta and Sukabumi, while in Bekasi Regency it leads to Jakarta and Bandung, in Sukabumi it leads to Bogor/Jakarta, while in Tasikmalaya Regency it leads to Bandung City. In line with Baum-Snow (2007), road construction affects the formation of cities (conversion of agricultural land) and causes the population to spread out along the highway.

b. Distribution pattern of paddy fields and conversion of paddy fields according to spatial designation

The pattern of distribution of paddy fields in 2013 according to spatial designation is illustrated by a bar chart (Figure 3.5), where both high and low industrialization and urbanization rural areas have paddy fields in the space-agricultural designation. Wet land (PR-PLB) is relatively dominant, which is shown in the green bar chart, and the presence of paddy fields in the designation of industrial trade settlement space (PR-PPI) which is shown in the red bar chart is relatively dominant in rural areas with high industrialization and urbanization (Bekasi Regency and Kabupaten Bekasi, Bogor).

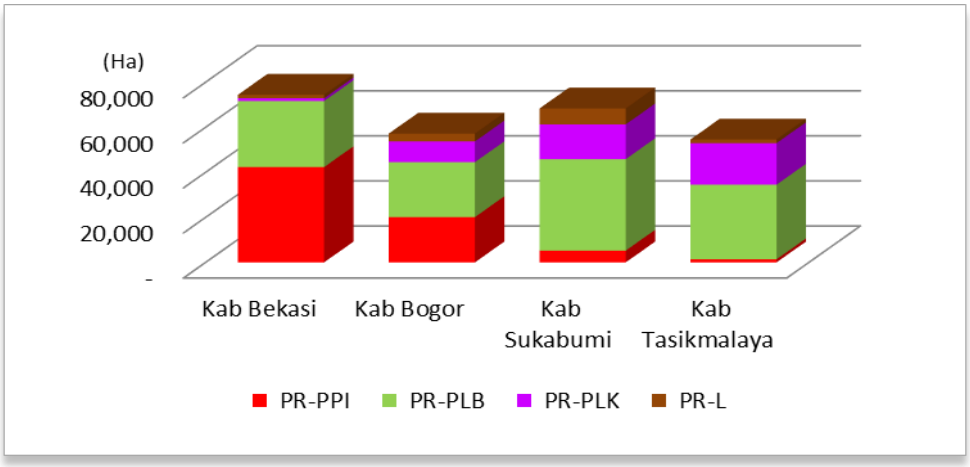


Figure 5. *Pattern of distribution of paddy fields in 2013 by spatial designation*

Spatially, the distribution of paddy fields with PR-PPI is shown in red area and the distribution of paddy fields with space designation for wetland agriculture (PR-PLB) is shown in green (Figure 3.6). This condition illustrates that the implementation of spatial planning policies/regulations has not fully protected the existence of paddy fields from land conversion, even providing opportunities for the conversion of paddy fields to built up land (settlement, trade, industry) which is indicated by the allocation of the pattern of rice field space designation in the form of PR -PPI especially in rural areas with high industrialization and urbanization.

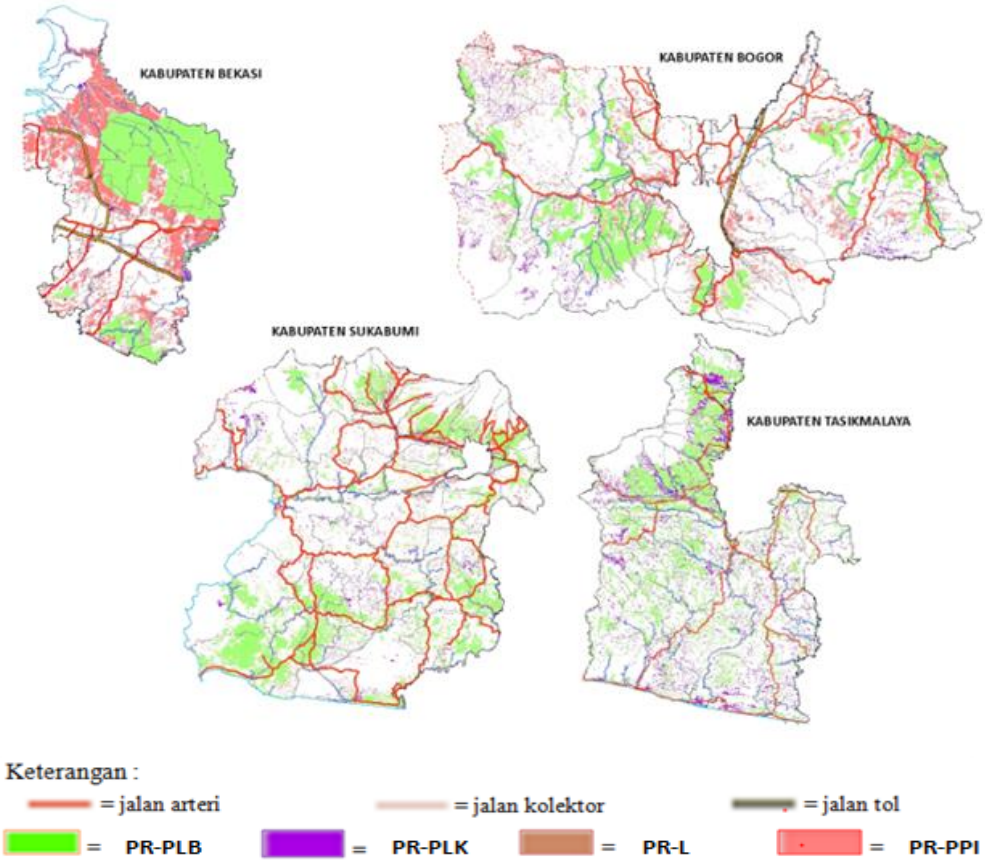


Figure 6. *Spatial distribution of paddy fields in 2013 by spatial designation*

The pattern of paddy field conversion for the period 2013-2018 according to spatial designation is illustrated in a bar chart (Figure 3.7) showing the conversion of paddy fields in rural areas to industrialization and high urbanization, dominant in paddy fields with PR-PPI, in Kabupaten Bekasi reached 93.26% and in Bogor Regency reached 78.91%. The conversion of paddy fields is dominant in the PR-PPI, in direct proportion to the distribution of paddy fields that are dominant in the PR-PPI, in other words, the policy of implementing spatial planning can accelerate the conversion of paddy fields, where by regulation, rice fields with PR-PPI are allowed to be converted into built-up land. (housing, trade and industry), so that the conversion of rice fields with PR-PPI is relatively high compared to rice fields with PR-NPPI (PR-PLB, PR-PLK and PR-L). In line with Nickerson (2004) zoning arrangements effectively slow down the rate of conversion of agricultural land, where land with low values will generally be converted later in areas with low population density and agricultural zoning reduces land values. Meanwhile, according to Nasoetion and Winoto (1996) high land conversion is the impact of policies that provide wider investment opportunities that are not matched by policy instruments for controlling land conversion.

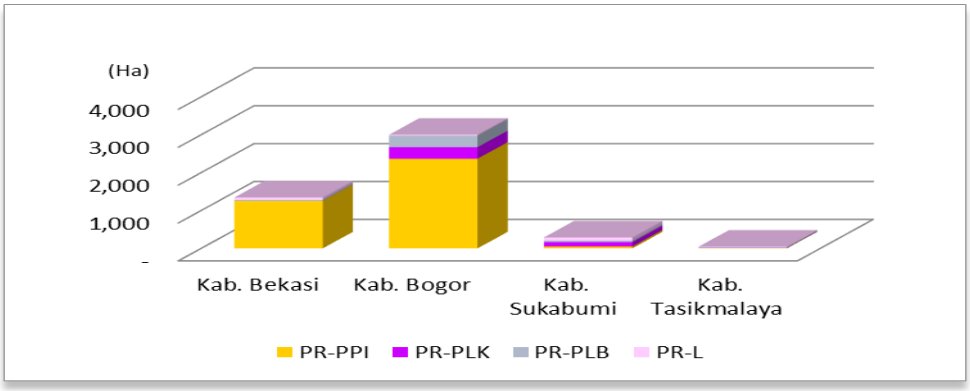


Figure 7. *Pattern of paddy field conversion for the period 2013-2018 according to space allocation*

c. Pattern of paddy field distribution and paddy field conservation by land

Price The lowest paddy field price distribution is less than Rp. 50.000, - per m2[covering] an area of 33,910 ha (13.33%) and the highest price is more than Rp. 1,500,000, - per m2[covers] an area of 115 ha (0.05%). Dominant paddy fields in the price range between Rp. 50,000, - to Rp. 150.000, - per m2[covering] an area of 131,957 ha (51.86%), spatially indicated the area is light green/light green (Figure 5.9). The distribution pattern of paddy fields based on land prices shows the same pattern in both high and low industrialized and urbanized rural areas, namely the dominant land price between Rp. 50.000, - up to Rp. 150.000, - per m2 (Figure 3.8). The trend of linear conversion of paddy fields is inversely proportional to land prices, this condition is in line with Walters (2013) where land demand will increase when agricultural land prices are low and vice versa.

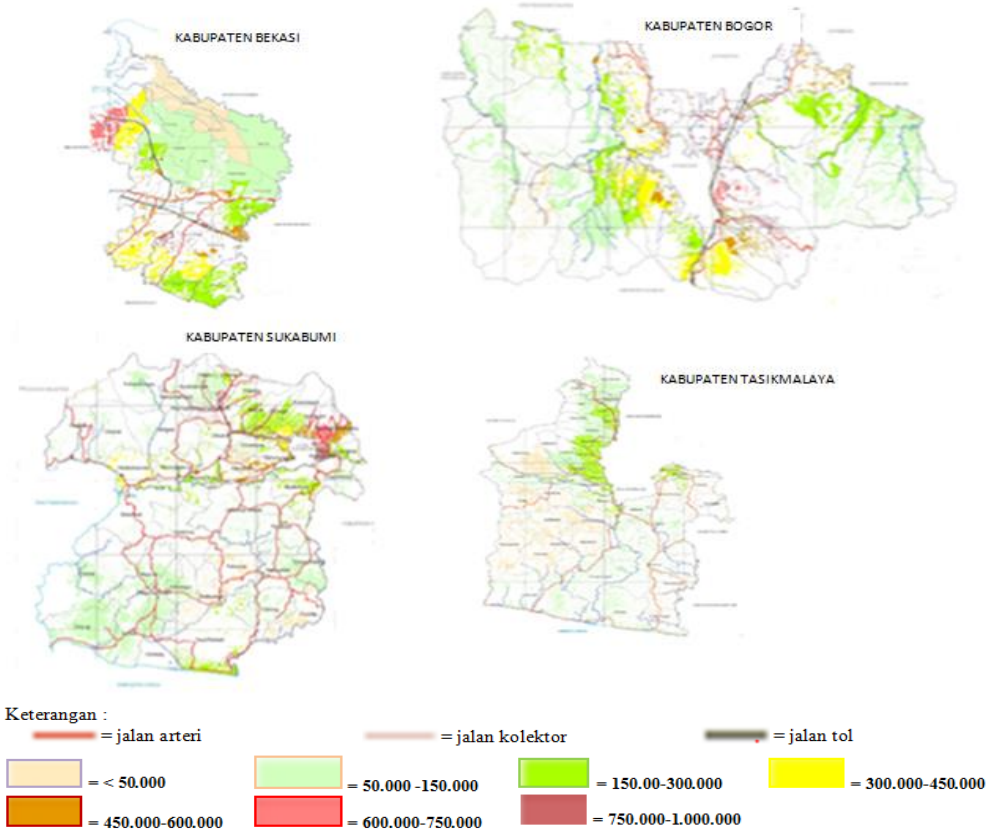


Figure 8. *Spatial pattern of distribution of paddy fields in 2013 according to land prices*

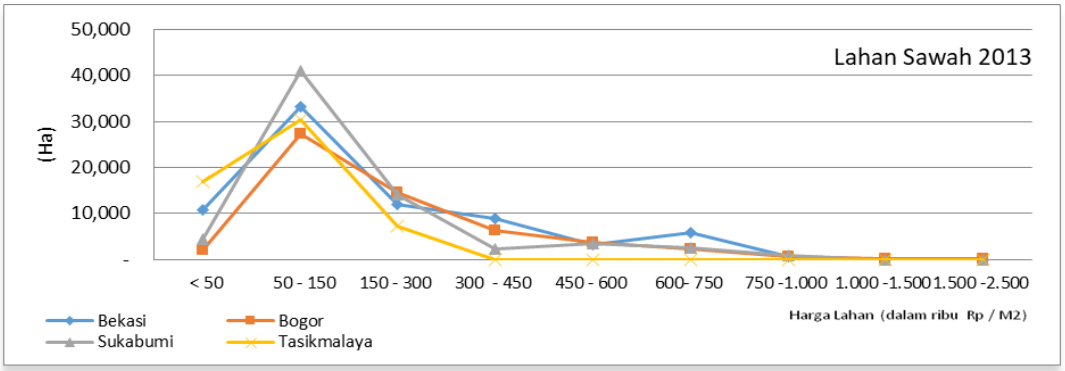


Figure 9. *Pattern of distribution of paddy fields in 2013 according to land prices*

3.2 Rice field conversion factor

Analysis The results of *multiple linear regression analysis* at the study site (Table 3.2), where from 24 independent variables (X1-X24) several variables (X) occurred multicollinearity and were excluded from further regression analysis. According to Juanda (2009), multicollinearity becomes a serious problem if the purpose of the modeling is to predict the relationship between Xj and Y, so that the estimated regression coefficient is unreliable as a result, it is difficult to separate the effect of each independent variable.

Table 2. Multiple linear regression analysis of road access factors, space allocation, land prices and population density affecting rice field conversion. Variable

Factors	Kab Code	.	. Bekasi		Regency. Bogor		Regency. Sukabumi		Kab. Tasikmalaya	
			Coeffi cient	P-value	Coeffi cient	P-value	Coeffi cient	-value	Coeffi cient	P
Road Access	X1	PJ-A	-	-	-2.92652	0.529	-5.27010	0.021*	.684818	0.073 **
	X2	PJ-K	-	-	-.230589	0.967	.328983	0.540	.020948	0.828
	X3	PJ-T	-8.501569	0.476	-	-	-	-	-	-
	X4	PJ-AKT	1.236615	0.626	-	-	-	-	-	-
	X5	L-SW	-	-	-	-	-	-	-	-
	X6	0-1 DJ	-	-	.362066	0.018 *	.023348	0.065**	-	-
	X7	1-3 DJ	-	-	-	-	-.019151		-.003135	0.429
	X8	0-3 DJ	-	-	-	-	-	-	-	-
	X9	> 3 DJs	-	-	.007715	0.875	-	-	-	-
Space allotment	X10	FP-PPI	-.015847	0.435	-	-	-	-	.031672	0.588
	X11	FP-PLB	-.012176	0.330	-	-	.000102	0.983	.001053	0.720
	X12	FP-PLK	-.132954	0.550	-166320	0.109	.006805	0.466	.007627	0.311
	X13	FP-L	-	-	-	-	-	-	-	-
	X14	FP-NPPI	-	-	-	-	-	-	-	-
	X15	0-1 DJ-PPI	.043099	0.538	-	-	.019225	0.716	-.026212	0.603
	X16	1-3 DJ-PPI	-	-	-	-	.037546	0.698	.334972	0.025 *
	X17	0-3 DJ-PPI	-	-	-	-	-	-	-	-
	X18	> 3 DJ-PPI	-	-	.100879	0.395	-	-	-	-

	X19	0-1DJ-NPPI	-	-	-	-	-	-	-	-
	X20	1-3DJ-NPPI	.138614	0.074**	-.290453	0.031*	-	-	-	-
	X21	0-3DJ-NPPI	-	-	-	-	-	-	-	-
	X22	> 3DJ-NPPI	.39435	0.686	-	-	-	-	-	-
Land price	X23	HG-L	-.000045	0.284	.000012	0.421	-4.56000	0.822	-.00001	0.098**
Population Density	X24	KPD-P	.933174	0.448	- .91462(	0.103	.227254	0.083**	-.017361	0.800

Source: Sukiptiyah, 2021

Remarks :
- = excluded from the analysis process because there is high multicollinearity;
* = Significant P-value < 0.05 and ** = Significant P-value < 0.10
R-square : Kab. Bekasi (41.03%); Regency. Bogor (31.22%); Sukabumi District (32.90%); Tasikmalaya Regency (67.16%)

Multiple linear regression analysis in the 4 (four) districts of the research location (Table 3.2) shows that there are 6 independent variables (X) that *significantly* affect the conversion of paddy fields, namely X1 (PJ-A); X6 (0-1 DJ); X16 (1-3 DJ-PPI); X20 (1-3 DJ-NPPI); X23 (HG-L) and X24 (KPD-P). The analysis of the factors that affect the conversion of paddy fields in terms of road access, space allocation, land prices and population density are as follows.

a. Analysis of road access factors

The results of the analysis of road access factors (Table 3.2) in the first row show that the variable X1 (PJ-A) is the factor of the length of the arterial road which is relatively inconsistent in influencing the conversion of paddy fields as indicated by the coefficient value, where in Sukabumi and Bogor Regency has no significant negative correlation, while in Tasikmalaya Regency it has a significant positive correlation. Variable X6 (0-1 DJ) is the factor of paddy field area 0-1 km from the road which is relatively consistent in influencing the conversion of paddy fields which is shown from the coefficient value, which is both in Bogor Regency (rural industrialization and high urbanization) and Sukabumi Regency (industrialized rural area). and low urbanization) is significantly positively correlated with the conversion of paddy fields. This indicates that the location/position of paddy fields relative to road access affects the conversion of paddy fields compared to the length of the road.

The proximity of paddy fields to road access is relatively consistent in influencing the conversion of paddy fields, both in industrialized and high urbanized rural areas (Bogor Regency) as well as in low industrialized and urbanized rural areas (Sukabumi Regency) as indicated by the X6 variable (0-1 DJ), namely the area factor. paddy field area 0-1 km from the road is positively correlated to affect the conversion of paddy fields. In line with Baum-Snow (2007) road construction affects city formation (conversion of agricultural land into built-up land) and causes population to spread along highways, and Rustiadi *et al* (2018) conversion of paddy fields to built-up land is inversely proportional to distance from toll roads.

b. Space allocation

Factor analysis the results of the second row of space designation factor analysis (Table 3.2) show that the space designation factors X10 (PPI), X11 (PLB) and X12 (PLK)

in rural areas with high industrialization and urbanization (Bekasi Regency and Bogor Regency) have a negative correlation. rice field conversion, while in rural areas low industrialization and urbanization (Sukabumi Regency and Tasikmalaya Regency) have a positive correlation with rice field conversion. Furthermore, in terms of space designation and road access factors, it shows that the X16 variable (1-3 DJ-PPI) is rice field area of 1-3 km from the road with the designation of industrial trade settlement space (PR-PPI) in rural areas with low industrialization and low urbanization. (Tasikmalaya Regency and Sukabumi Regency) positively correlated to affect the conversion of paddy fields or directly proportional to the conversion of paddy fields. While the X20 variable (1-3 DJ-NPPI) is paddy fields in an area of 1-3 km from the road with a non-residential designation for industrial trade (PR-NPPI) in rural areas of industrialization and high urbanization (Bogor Regency) which has a significant and negative correlation. conversion of paddy fields or inversely proportional to the conversion of paddy fields. This indicates that the implementation of regulations for the implementation of spatial planning through the regulation of the allocation of the pattern of land use for paddy fields in each rural area can have an impact on encouraging or controlling the conversion of paddy fields.

The conversion of paddy fields to built-up land in Bogor Regency can be controlled, especially in the area of rice fields 1-3 km from the road with the NPPI space designationIn contrast to Bekasi Regency, the opposite is true, which is significantly positively correlated, this can happen due to the slow or weak supervision of the implementation of spatial planning, especially in the KKPR approval (formerly the issuance of Location Permits) for economic development activities, which ultimately has an impact on legal problems (Meykarta Bekasi).

c. Factor analysis of land prices and population density

The results of the regression analysis of land price factors (Table 3.2) third row shows that the land price factor X23 (HG-L) has a negative correlation with rice field conversion which is indicated by a negative coefficient value (Bekasi Regency, Sukabumi Regency) and Kabupaten Tasikmalaya) even in Kabupaten Tasikmalaya significantly negatively affected the conversion of paddy fields. In line with the study of Walters (2013) in Govind Prasad and Manikandan (2014), where land demand will increase when agricultural land prices are low and vice versa, there is an inverse relationship between demand for agricultural land and land prices. While The results of the regression analysis of the population density factor (Table 3.2) the fourth row shows that the population density factor X24 (KPD-P) is positively correlated to affect the conversion of paddy fields which is indicated by a positive coefficient value (Bekasi Regency, Bogor Regency and Sukabumi Regency) even in Sukabumi Regency is significant. positively correlated to affect land conversion, with relatively large coefficient values in Bekasi Regency and Bogor Regency. Land conversion is directly proportional to population density, where the demand for land for various purposes such as residential, industrial, commercial, educational and other uses will continue to occur with the increase in population, in line with Raj *et al* (2011) that as the population increases, the demand also increases. housing that can drive the demand for agricultural land thus causing the conversion of agricultural land. In addition to the need for housing, the high population/population density also indicates that the labor market is quite available and wages can be reduced, thereby encouraging the growth of industrial activities or businesses that can drive demand for agricultural land and lead to conversion of agricultural land. On the other hand, population growth that continues to increase has consequences for changes in the allocation of land resources between sectors. Reallocation is prioritized on uses that have a high *rate of*

return, such as land use for industrial activities as the main activity that can attract the development of other activities such as settlements, trade, and infrastructure.

3.3 Rice field conversion potential

The results of the multi-criteria spatial analysis of 4 (four) criteria (spatial designation, road access, population density and land price) obtained data/maps of potential conversion of paddy fields at the research location based on the level of industrialization and urbanization (Figure 3.10). The distribution pattern of potential conversion of paddy fields in industrialized and highly urbanized rural areas (Bekasi Regency and Bogor Regency) is classified as "high" spread along the road with a fairly large percentage. The potential for conversion of rice fields classified as "high" in Bekasi Regency reaches 14,612 ha (20%), while in Bogor Regency it reaches 3,250 ha (6%) of the total paddy field area in 2018. Meanwhile, in rural areas industrialization and urbanization are low, namely Sukabumi Regency and Regency of Tasikmalaya, spatially the potential for rice field conversion is classified as "high" at only 2% and 1% of the total area of rice fields in 2018, and dominantly in the category of potential for conversion to rice fields as "low" which is 68% and 70%. The priority of the revision of the Spatial Plan (RTR) is recommended in rural areas with the potential for conversion of "high" rice fields, especially in rural areas with high industrialization and urbanization.

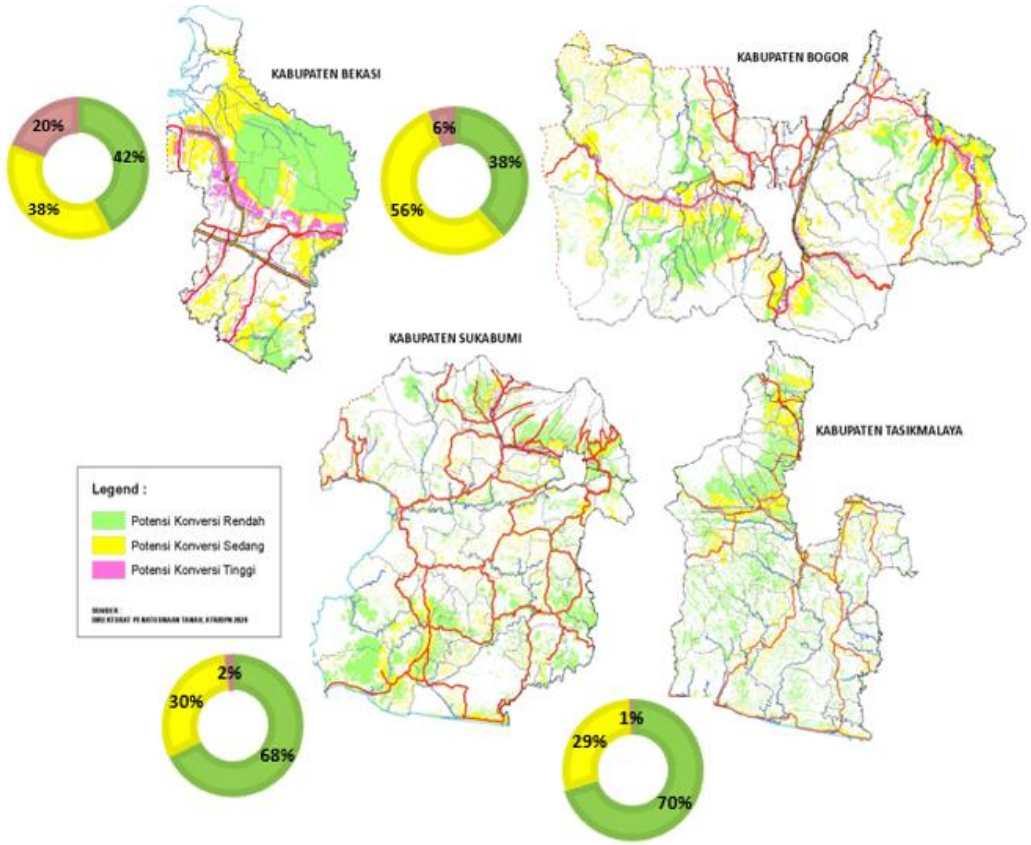


Figure 10. *The pattern of distribution of potential conversion of paddy fields in the research location*

IV. Conclusion

1. The distribution of paddy fields according to road access in both high and low industrialized rural areas and urbanization is the same pattern, where most of them are in an area > 3 km from the road, spatially divided into 2 The clusters, namely the Bekasi Regency cluster, are spread over a fairly massive stretch on the north side and the Bogor Regency, Sukabumi Regency and Tasikmalaya Regency clusters are relatively spread out throughout the region with less massive stretches. The distribution of paddy fields according to the spatial designation is dominant in the designation of wetland agricultural space (PR-PLB), while the distribution of paddy fields with the designation of industrial trade settlements (PR-PPI) is dominant in rural areas with high industrialization and high urbanization;
2. Conversion of paddy fields into built-up land is dominant in rural areas with high industrialization and urbanization, dominant in paddy fields with the designation of industrial trade-settlement space (PR-PPI), and dominant in rice fields in an area of 0-3 km from the road;
3. The allocation of space for paddy fields can have an impact on encouraging or controlling the conversion of paddy fields, where paddy fields with PR-PPI can encourage conversion of paddy fields, on the other hand, paddy fields with non-residential designation for industrial trade (PR-NPPI) conversion of paddy fields can be controlled relatively;
4. Revision of Spatial Planning (RTR) is recommended in rural areas with relatively high potential for conversion of paddy fields, namely in rural areas with high industrialization and urbanization.

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