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Identify Land Use and ITS Alignment Against RT/RW Pekalongan Regency

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ABSTRACT

Land use is the result of every form of intervention of human activities on land on the earth's surface that is dynamic and functions to meet the needs of life, both material and spiritual. Regional Spatial Planning is a form of intervention that is carried out so that human interaction with the environment can run harmoniously, harmoniously, and balanced. This aims to achieve human welfare. This study aims to identify land use in the Pekalongan Regency in 2023 and identify the alignment of land use with the RTRW of the Pekalongan Regency. The method used is the analysis of geographic information and the logical matrix of alignment. The results of the study show that the study area has 11 types of land use with the largest area, namely rice fields (3,223.34 Ha), settlements (2,611.46 Ha), and ponds (1,781.85 Ha). The alignment of land use with the RTRW obtained is divided into 3 (three), namely aligned, transitional, and not aligned with the area of 5,705.42 Ha, 605.86 Ha, and 2,821.58 Ha, respectively.

Introduction

Pekalongan Regency is a combination of flat areas in the north and highlands/mountains in the south. The altitude of the area on the north coast ranges from 0-2 meters above sea level, with a beach length of about ±10.5 Km. The relatively flat slope of the slope results in frequent inundation due to flash floods and floods due to high rainfall during the rainy season and poor drainage (Yuwono et al., 2024). The problem of flash flood disasters in Pekalongan Regency began with spatial (spatial) problems. The change in the use of pond land, mangroves, rice fields and settlements that dominate on the coast is not balanced by rehabilitation by planting mangroves around the coast and riverside as a natural wave barrier so that seawater easily enters through river estuaries whose mangroves have been eroded as a result of abrasion (Setyaningrum, Yuniartik, Dewi, & Nugrahani, 2019).

Land use is closely related to human activities and land resources (Perkasa, Istiqomah, & Aisiyah, 2022). Some other opinions about land use include: according to (Adysahwan, Syafri, & Tato, 2022), land use is the result of any form of human intervention on land on the earth's surface that is dynamic and functions to meet the needs

of life, both material and spiritual; According to (Baja, 2012), land use is related to human activities that are directly related to land where the use and utilization of land, existing resources, and causes impacts on land. In addition, according to (Katayane, Puturuhu, & Botandri, 2024), land use needs to be directed according to its function to avoid negative development impacts. According to (Matitaputy, Retraubun, Selanno, Papilaya, & Puturuhu, 2024), the increase in the population increased the need for land faced with a relatively fixed land area. Therefore, population growth greatly affects land use and changes in its use.

According to (Zulkaidi, 1999), changes in land use from planned designations in an area are usually caused by a discrepancy between the considerations underlying the plan direction and the considerations of market players. The use of land by every development activity must be in line with the principles of sustainable development, namely economic, social, cultural, and environmental development. The development that takes place cannot be avoided due to the excessive use of natural resources (Lahamendu, 2015).

Space utilization is a series of development programs that utilize space based on a period that has been determined in the regional spatial plan. Space use can function to support the sustainable development process with wise land use, namely land use for protection and cultivation functions.

The Regional Spatial Plan (RTRW) is a binding planning document for all development actors. Spatial planning is a process to determine the spatial structure and spatial pattern which includes the preparation and determination of spatial plans (Law No. 26/2007). According to (Simatupang, Rustiadi, & Situmorang, 2011), spatial planning is a vision of the future spatial configuration form that describes a systematic form of physical, social, and economic aspects to support and direct space to increase productivity to meet human needs sustainably. The purpose of regional planning is to create an efficient, comfortable, and sustainable life. The determination of the chosen planning location must provide the maximum efficiency and harmony, from various conflicts of interest. Good spatial planning should be able to help reduce the impact of a natural disaster, both in terms of planning, utilization, and control of regional spatial planning, especially areas located in natural disaster-prone areas, so that consistency between spatial planning and space utilization is the main requirement for the realization of harmony and harmony between protected areas and cultivation areas (Anggraini & Muta'ali, 2013).

The purpose of this study is the identification of land use in 2023 in the Pekalongan Regency and the identification of land use alignment with the Pekalongan Regency RTRW.

Research Methods

Research Time and Location

The research was carried out from June to July 2023 with the research study area carried out in 5 (five) sub-districts in Pekalongan Regency, namely Wonokerto District,

Tirto District, Buaran District, Wiradesa District, and Siwalan District with a study area of 9,132.87 Ha. The map of the research location can be seen in Figure 1.

Types of Data, Data Sources, Materials, and Tools Used

The data used in this study are primary data and secondary data. Primary data is obtained directly from the field to verify the results of image interpretation, while secondary data is obtained from the internet and related agencies. The data used consisted of Google Earth Imagery in 2023 obtained from the internet, spatial pattern maps (RTRW of Pekalongan Regency in 2020-2040) from the Pekalongan Regency BAPPEDA, as well as administrative maps, road maps, and river maps from the Geospatial Information Agency (BIG). The tools used are Google Earth Pro, ArcMap 10.8, GPS, and Microsoft Excel.

Data Collection and Analysis Techniques

Primary data collection is carried out directly in the field, which in this case is related to the accuracy test of image interpretation, while secondary data collection is obtained from the internet and related agencies. The data collection and analysis techniques can be seen in Table 1 below.

Table 1
Data Collection and Analysis Techniques

No.	Research Objectives	Data Type	Analysis Techniques	Output
1	Land use identification	- Administrative Map - Google Earth *imagery* in 2023	- Image interpretation	- 2023 land use map
2	Identification of land use alignment with the Pekalongan Regency RTRW	- 2023 land use map - Spatial Pattern Map of Pekalongan Regency RTRW in 2020-2040	- Overlay - *Query (Pivot Table)* (Nature, 2016)	- Map of land use alignment to RTRW - Matrix of land use alignment to RTRW

Here is a map of the research location

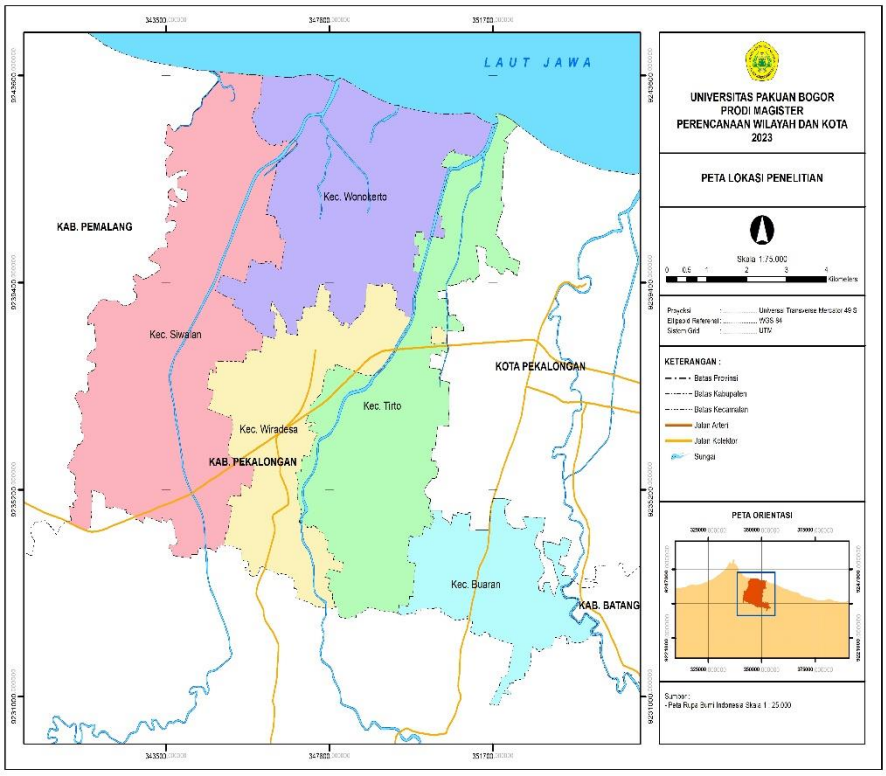

Figure 1. Map of the Research Location

Results and Discussion

Land Use of Pekalongan Regency

Land use in Indonesia is generally the result of a long process of constant interaction, balance, and dynamic conditions between the activities of the population on the land and the limitations in the living environment. Based on the results of image interpretation, land use in 2023 in Pekalongan Regency consists of 11 (eleven) types of land use, namely industry, roads, sand, settlements, rice fields, rivers, ponds, vacant land, mixed crops, embankments, and moors. The land use with the largest area is rice fields with an area of 3,223.34 hectares or equivalent to 35.29% of the study area. More specifically, land use in Pekalongan Regency can be seen in Table 2 and Figure 2 below.

Table 2
Land Use in 2023

No.	Land Use	Area (Ha)	Area (%)
1	Industry	85,05	0,93
2	Road	1,65	0,02
3	Pasir	58,14	0,64
4	Settlements	2.611,46	28,59
5	Paddy	3.223,34	35,29
6	River	208,21	2,28
7	Pond	1.781,85	19,51
8	Vacant Land	11,47	0,13
9	Mixed Crops	440,69	4,83
10	Tanggul	29,50	0,32

11	Tegalan	681,51	7,46
Total Area (Ha)		**9.132,87**	**100,00**

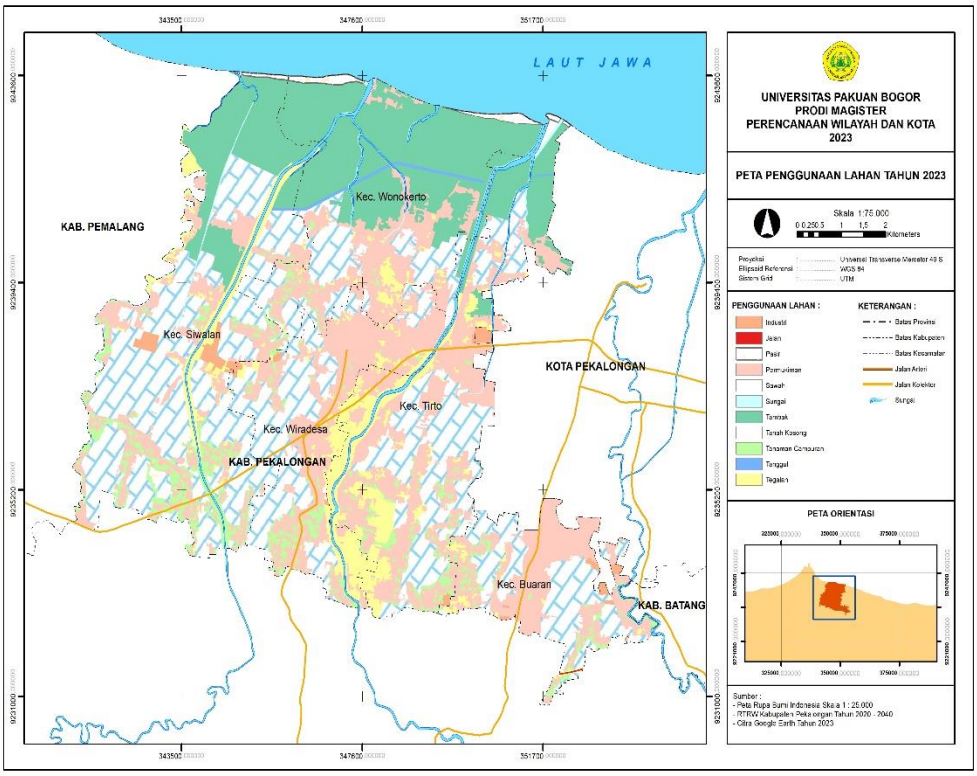

Figure 2
Pekalongan Regency Land Use Map in 2023

Based on the figure above, it can be seen that the northern part of Pekalongan Regency is dominated by the use of pond land with an area of 1,781.85 Ha (19.51%). This is by its location adjacent to the beach/coast. Furthermore, in other parts, it is dominated by the use of rice fields and settlements with an area of 3,223.34 Ha (35.29%) and 2,611.46 Ha (28.59%), respectively. The settlements with the largest area are in Tirto and Wiradesa Districts. This is directly proportional to the number of people contained in the Pekalongan Regency in the 2023 figures.

Alignment of Land Use to RTRW Pekalongan Regency

Regional Spatial Planning is a form of intervention that is carried out so that human interaction with the environment can run harmoniously, harmoniously, and balanced. This aims to achieve human welfare.

The evaluation of land use alignment was carried out by overlaying the 2023 land use map with the spatial pattern map of the Pekalongan Regency RTRW in 2020-2040 using ArcMap 10.8 software. The output of this process is the alignment map and alignment matrix obtained by using the PivotTable function in Microsoft Excel.

The alignment of land use for the RTRW is divided into 3 (three), namely aligned, transitional, and inconsistent. Aligned means that land use is by spatial patterns, transition means that land use is still possible to return by spatial patterns and non-aligned means

that land use is not by spatial patterns. The alignment matrix can be seen in Table 3, while the extent of the alignment of the analysis results can be seen in Table 4.

Table 3
Matrix of Land Use Harmony for RTRW of Pekalongan Regency

OT Year 2023	Spatial Pattern of RTRW of Pekalongan Regency in 2020-2040 (Ha)										
	Jl	CREAM	KH	KPB	KPD	KPK	KPI	KTP	SP	SS	Sng
In	T	X	X	X	T	T	And	X	X	X	X
Jl	And	X	X	X	X	X	X	X	X	X	X
Psr	T	X	X	X	X	X	X	X	And	X	X
Pkm	T	X	X	X	And	And	T	X	X	X	X
S	T	X	T	T	X	X	X	And	X	X	X
Sng	X	X	X	X	X	X	X	X	X	And	And
Tmk	T	T	X	And	X	X	X	X	And	And	And
TK	And	T	T	T	T	T	T	X	X	X	X
TC	T	X	And	X	X	X	X	T	X	X	X
Tng/PB	And	And	And	And	And	And	And	And	And	And	And
Tg	And	T	And	And	T	T	T	T	X	X	X

Information:

PL = Land Use, Ind = Industry, Jl = Road, Psr = Sand, Pkm = Settlement, Swh = Rice Field, Sng = River, Tmk = Pond, TK = Vacant Land, TC = Mixed Crops, Tng/PB = Embankment/ Flood Paddle, Tg = Gravel; KEM = Mangrove Ecosystem Area, KH = Horticultural Area, KPB = Aquaculture Area, KPD = Rural Settlement Area, KPK = Urban Settlement Area, KPI = Industrial Allocation Area, KTP = Food Crop Area, SP = Coastal Boundary, SS = River Boundary; Y = Suitable, T = Transition, X = Not Suitable.

Table 4
Extent of Land Use Harmony with RTRW

Space Pattern	Alignment (Ha)		
	Selaras	Transition	Misalignment
Road	4,25	2,49	
Mangrove Ecosystem Area		60,79	5,30
Horticultural Area	5,41	2,02	2,52
Aquaculture Fisheries Area	1.087,68	20,88	10,32
Rural Settlement Areas	983,50	91,05	652,77
Urban Settlement Areas	1.522,92	121,07	727,77
Industrial Allocation Area	82,54	78,26	1.013,18
Food Crop Area	1.646,74	229,31	75,18

Coastal Boundaries	64,93		4,86
River Boundary	99,25		329,68
River	208,21		
Total Area (Ha)	**5.705,42**	**605,86**	**2.821,58**

The results of the analysis show that an area of 2,821.58 Ha (30.89%) of land use in 2023 is not in line with the Pekalongan Regency RTRW. The largest discrepancy occurred in the industrial allocation area of 1,013.18 Ha. Meanwhile, the largest alignment occurred in the allocation of food crop areas covering an area of 1,646.74 hectares and urban settlement areas covering an area of 1,522.92 hectares. The extent of this alignment in detail can be seen in the matrix of land use deviation for the Pekalongan Regency RTRW presented in Appendix 1. Meanwhile, spatially the alignment map can be seen in Figure 3.

The area with the harmonized category shows that it is still much wider than the transition or inconsistent. However, this still needs to be considered so as not to cause an imbalance in the use of resources in the future.

The high number of land use inconsistencies shows that the implementation of land use has not entirely referred to the RTRW. This is due to the lack of public knowledge about the existence and function of RTRW due to limited land allocation direction from the local government, namely, direction is carried out only to individuals and/or legal entities who apply for location permits or land rights, while the community, in general, does not. Some of the things that can be done to overcome this problem include socialization to the general public regarding the existence of RTRW, increasing briefings to individuals and/or legal entities who apply for location permits or land rights, and the application of sanctions to every perpetrator of land use violations. According to (Djakapermana, Sitorus, Marimin, & Rustiadi, 2005), the use of space by the spatial plan and orderly in its control can realize community welfare and sustainable environmental protection.

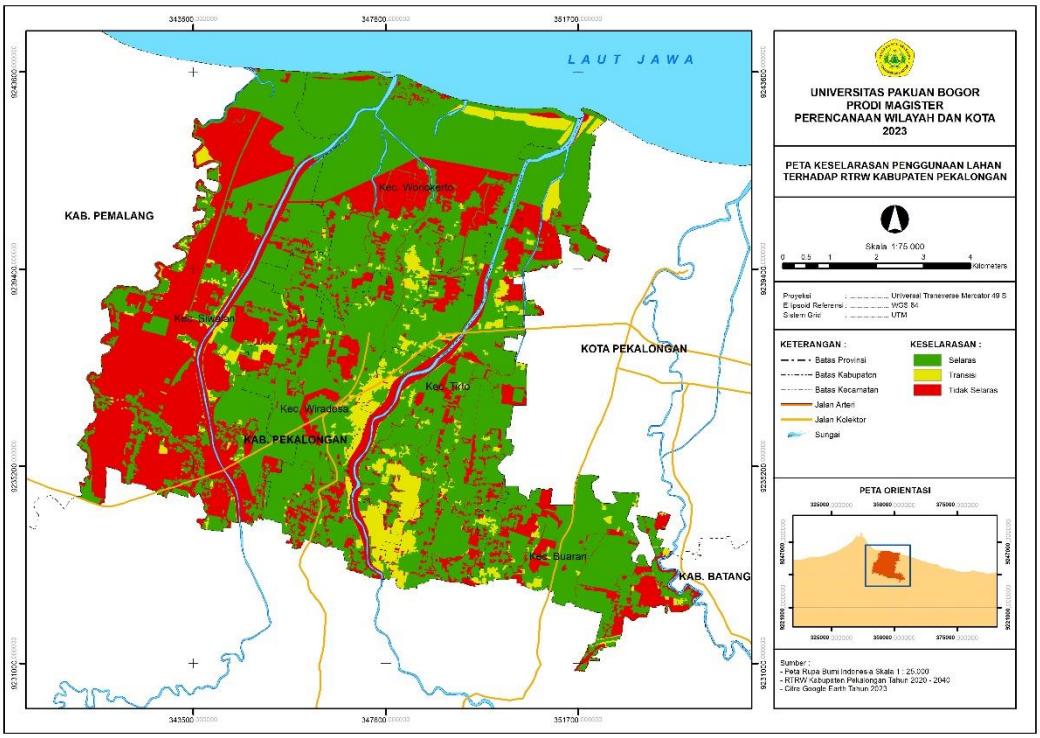

Figure 3
Map of Land Use Harmony for RTRW of Pekalongan Regency

Conclusion

Land use in Pekalongan Regency in 2023 consists of 11 types of land use, including industry, roads, sand, settlements, rice fields, rivers, ponds, vacant land, mixed crops, embankments, and moorlands. The largest land use is rice fields covering an area of 3,223.34 Ha (35.29%), settlements covering an area of 2611.46 Ha (28.59%), and ponds of 1781.85 Ha (19.51%). As much as 62.47% of the existing land use is in line with the Pekalongan Regency RTRW for 2020-2040. Meanwhile, 6.63% transitioned and 30.89% were out of alignment. Although the category of alignment is much broader than transition and is not aligned. However, this still needs to be considered so as not to cause an even greater imbalance in the use of resources in the future.

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