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Supporting Sustainable Communities in Slum Settlement Areas by Optimizing Geospatial Technology and Land Management Approaches in Kertapati District, Palembang

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Abstract
Slum areas have always been a concern in development planning. In fact, this has become one of the goals of the 2030 Sustainable Development Goals (SDGs), especially Sustainable Cities and Communities. According to the United Nations Development Program (UNDP), in the coming decades, 828 million people are estimated to live in urban slums and this number will continue to increase. While in Indonesia, there are slum areas covering an area of 86,548 hectares, 28% of which are located on the island of Sumatra. Palembang, one of the big cities in Sumatra, also faces the problem of slum settlements in its urban area, which is 3,607 hectares. This study aims to determine the level of slums in the residential area in Kertapati District which is included in the slum area in Palembang City and furthermore, recommends the concept of land management as a solution to these problems. The variables used in this study consisted of the physical variables of settlements, basic infrastructure and land ownership. Data on building density, building layout and building construction are used to describe the physical variables of settlements. While the basic infrastructure variables are explained by data on clean water infrastructure, solid waste infrastructure, drainage infrastructure, residential road infrastructure and sanitation infrastructure. For the variable of land ownership, data on status and land ownership are used. The data was obtained through Sentinel 2A satellite imagery in 2022 and from conducting field surveys and in-depth interviews with several local residents. Furthermore, the data was analyzed using a map overlay-based scoring of each variable using a Geographic Information Systems. The results of this study obtained a map of each variable level of settlement slums and a map of the slum level of settlements in Kertapati District with the level of settlement slums divided into light slum classes in 2 villages with a percentage of 11.51%, medium slum class in 1 village with a percentage of 35.96% and heavy slum class in 3 villages covering 52.53% of the total area of Kertapati District. This shows that the settlements in Kertapati District are dominated by heavy class slums, so this study recommends the concept of Land Consolidation land management with the Land Readjustment approach as an alternative to handling slum areas in Kertapati District, Palembang City.

Keywords: Kertapati; Land Management; Geographic Information Systems; Slum Area; Sustainable Communities

1. Introduction

Slum areas have always been a concern in development planning. This is important because according to the United Nations Projection (2015), the world's population will grow to around 8.5 billion in 2030. Therefore, the problem of settlements is an important part of world population growth and has even become one of the goals of sustainable development. The 2030 Development Goals (SDGs) are precisely the 11th goal, namely Sustainable Cities and Communities which ensures access to decent, safe and affordable housing and basic services for all and improves the quality of slum settlements. According to the United Nations Development Program (UNDP), in the next few decades 90% of urban expansion will occur in developing countries and 828 million people are estimated to live in slums and the number will continue to increase.

Indonesia is a developing country with a high population growth rate from year to year, while the area of residential land is relatively fixed. The growth of settlements that is not accompanied by proper settlement development planning causes many Indonesians to live in slum areas. At least, there are slum areas of 86,548

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hectares spread throughout Indonesia, 28% of which are on the island of Sumatra. Palembang as the capital city of South Sumatra Province which is one of the largest cities in Sumatra and becomes the center of community activities, especially in South Sumatra Province, thereby encouraging high population growth in the area. Thus, the city of Palembang also faces the problem of slum settlements in its urban area, which is 3,607 ha. Based on the Central Statistics Agency (BPS) of Palembang City in 2018-2020, there are 18 sub-districts that are included in the Palembang City area. One of these sub-districts is Kertapati District.

Kertapati District has an area of 4710.3 Ha with a population of 90,977 people in 2020 (BPS City of Palembang 2020). Passed by the flow of the Musi River and has a high level of settlement density, Kertapati District has become one of the slum areas in Palembang City. In fact, The 1945 Constitution of Republic Indonesia in Article 28 H paragraph (1) mandates that "Everyone has the right to live in physical and spiritual prosperity, to have a place to live, and to have a good and healthy living environment and have the right to obtain health services". For this reason, the government needs to make efforts to overcome these problems, one of which is through Kota Tanpa Kumuh (KOTAKU) program is one of a number of strategic efforts by the government through the Directorate General of Human Settlements, Ministry of Public Works and Public Housing to accelerate the handling of slum settlements in Indonesia and support “Gerakan 100-0-100” namely achieving 100% access to drinking water, reducing the presence of slum settlements to 0%, and providing 100% proper sanitation for the people of Indonesia in 2019. Slums that do not meet health requirements both in terms of construction and environmental health facilities can be the cause and source of the spread disease and become a problem for the quality of an environment.

Regional development is always accompanied by the rate of population growth and the rate of development that will bring changes to the level of environmental quality. Therefore, it is important to monitor the development of slum areas and find out the level of slum settlements, especially in Kertapati District which is included in the slum area in Palembang City.

This study aims to to monitor the development of residential areas and assess the quality level of slum settlements. Then, provide recommendations for land management as a solution to the problem of slum areas in Kertapati District, Palembang City.

Study Area

This research was conducted in Kertapati District which has an area of 4710.3 Ha which is located in Palembang City, South Sumatra Province. Kertapati District is inhabited by 90,977 people (BPS Palembang 2020) and administratively Kertapati District consists of six sub-districts namely Kertapati, Ogan Baru, Keramasan, Karya Jaya, Kemas Rindo and Kemang Agung. Geographically, Kertapati District is directly adjacent to the Musi River, Gandus District in the North, Seberang Ulu I District and Ogan Ilir District in the East and Ogan Ilir District in the West and South.

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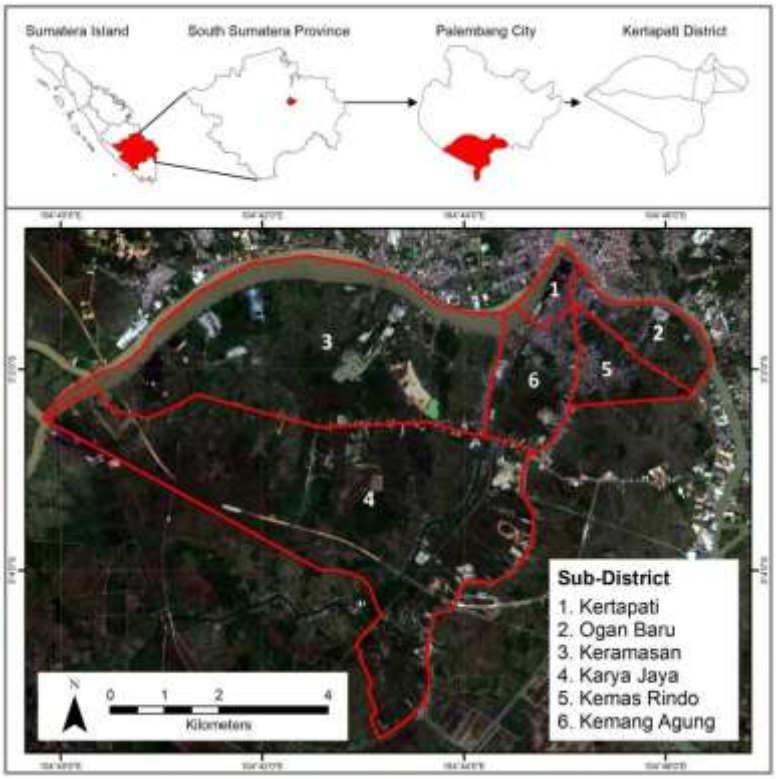

2. Methodology

The assessment of the quality level of the residential environment is influenced by 3 variables including the physical buildings, facilities and infrastructure as well as the status of land ownership, each of which includes indicators in it. Each variable and indicator will be explained in the following table:

Table 1. Research Variables

Variables	Indicators	Operational definition
Physical Building	Building layout	Conditions of regularity of building layout
	Building density	Density number between one building and another
	Building construction	Percentage of permanent, semi-permanent and non-permanent buildings
Facilities and supporting infrastructure	Clean water infrastructure	The level of clean water service is measured by the presence of clean water infrastructure
	Waste infrastructure	The level of waste infrastructure services is seen through field conditions
	Drainage infrastructure	Drainage conditions seen through field conditions
	Neighborhood Road Infrastructure	Environmental road conditions are seen through field conditions
	Sanitation Infrastructure	The level of sanitation infrastructure services is seen through field conditions
Land Ownership	Land legality status	Dominance of land certificates owned
	Land legality status	Dominance of land certificates owned
	Land Ownership Status	Dominance of regional land ownership

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Data collection was divided into two stages, namely pre-survey and field survey. A pre-survey was conducted to obtain secondary data through literature study and interpretation of sentinel-2A satellite imagery in 2021. The field survey includes primary data obtained by identifying sub-district and conducting interviews with the community to obtain data on building layout, building density, construction buildings, clean water infrastructure, solid waste infrastructure, drainage infrastructure, environmental road infrastructure, sanitation infrastructure, land legality statusand land ownership status.

The data analysis method used in this study is a mixed method between qualitative data analysis and quantitative data. Qualitative analysis was used to determine the type of land ownership and land management model in accordancewith the conditions of settlements with severe slum levels as well as an assessment of the physical parameters of buildings, infrastructure and land ownership used to determine the score of these parameters and then analyzed quantitatively using the Scoring method. Rating) of each parameter. As well as descriptive analysis will also be carried out to formulate a land management model that is suitable for handling heavy residential areas in Kertapati District.

Each variable that has been obtained from the interpretation of satellite imagery, field surveys and interviews andthen used in the assessment of the level of slums in the settlements is given a score based on the size of the influenceof each variable on the level of slums in the settlements. Where each parameter of settlement quality is given a valueand then multiplied by a weighing factor. The weighing factor serves to assess the size of the influence of the variableon the assessment of the quality of settlements, where the value is between one to three. The greater the influence of each variable, the greater the value of the weighing factor. Specifically for the value of weighing factors, considering that one of the objectives in this study is related to land management strategies, the development of provisions for weighing factors in this study is to use a weight value of 2 for the physical building variables and facilities – supporting infrastructure variable, and a weight value of 3 for the land ownership variable according to Ditjen Cipta Karya Departemen Pekerjaan Umum (2006), Ditjen Cipta Karya Departemen Pekerjaan Umum (1980) in Yuniawan (2011) ,Suprapto, et. al., (2020) and Safira (2018) which has been adapted. The following is a weighing factor for variables and values for each parameter:

Table 2. Scoring of Weighing Factors and Criteria for Settlement Slum Level Parameters

Variables	Weight	Indicators	Parameter	Score
Physical Building	2	Building Layout	>50% of the buildings in the residential units are arranged in order	1
			25-50% of the buildings in residential units are arranged in an orderly manner	2
			<25% of the buildings in the residential units are arranged in an orderly manner	3
		Building Density	Building density <40%	1
			Building density 40-60%	2
			Building density >60%	3
		Building construction	Areas with <25% temporary buildings	1
			Areas with temporary buildings 25-50%	2
			Areas with temporary buildings >50%	3

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Variables	Weight	Indicators	Parameter	Score
Facilities and supporting infrastructure	2	Clean Water Infrastructure	Clean water services exist	1
			Clean water services doesn't exist	3
		Waste Infrastructure	There is a waste service system	1
			There is a temporary waste service system	2
			There is no waste service system	3
		Drainage Infrastructure	Good drainage system	1
			Medium drainage system	2
			Bad drainage system	3
		Neighborhood Road Infrastructure	50% of environmental roads are paved with asphalt or cement	1
			25-50% of environmental roads paved with asphalt or cement	2
			<25% of environmental roads paved with asphalt or cement	3
		Sanitation Infrastructure	There is a wastewater service system	1
			There is no wastewater service system	3
Land Ownership	3	Land Legality Status	Areas with total SHM status >50%	1
			Areas with total HGB certificate status >50%	2
			Areas with uncertified status >50%	3
		Land Ownership	Areas with community-owned land ownership >50%	1
			Areas with total land ownership belonging to indigenous peoples >50%	2
			Areas with total state/private land ownership >50%	3

The determination of the slum level class of the settlement is based on the total score from the sum and multiplication of the values of each determining parameter with a weighing factor, in full as follows.

Total score: (2 x (Score of Building Layout + Building Density + Building Construction)) + (2 x (Score ofClean Water Infrastructure + Solid Waste + Drainage + Environmental Road + Sanitation)) + (3 x (Score of Land Legality Status + Ownership) Land).

Based on this formula, the classification of the level of slums in the Kertapati District settlements is arrangedby the formula C = R/K, with C = class interval, R = Range (maximum value-minimum value) and K = number of classes. The classification is obtained by the calculation:

Maximum Scoring Value: 44 Minimum Scoring Value 28So that the obtained Range (R) is as follows R: 44 – 28 = 16.

The number of classes to be built is 3 classes, so that the class intervals for the slum level of settlements are obtained as follows:

$C = R/K = 28/3 = 5.34 \approx 6$

Classification scores for the slum level class of settlements are shown in table 3 as follows.

Table 3. Class Classification of Settlement Slum Level

Interval Total Score	Slum Level
28 – 33	Light slum
34 – 39	Medium slum
40 – 44	Heavy slum

In formulating the land management model, it was obtained through a qualitative and descriptive analysis approach which was carried out using in-depth interviews and distributing questionnaires to the people of Kertapati District. In this analysis, the researcher took a sample of 3 houses per sub-district in Kertapati District to be able

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to represent the condition of settlements in each sub-district in Kertapati District which was intended to obtain the formulation of land management concepts to become a strategy for alleviating slum areas in Kertapati District.

3. Results and Discussions

Physical Building

The variable of the Physical Building consists of several indicators, namely Building Layout , Building Density and Building Construction. The following is a map describing each indicator.

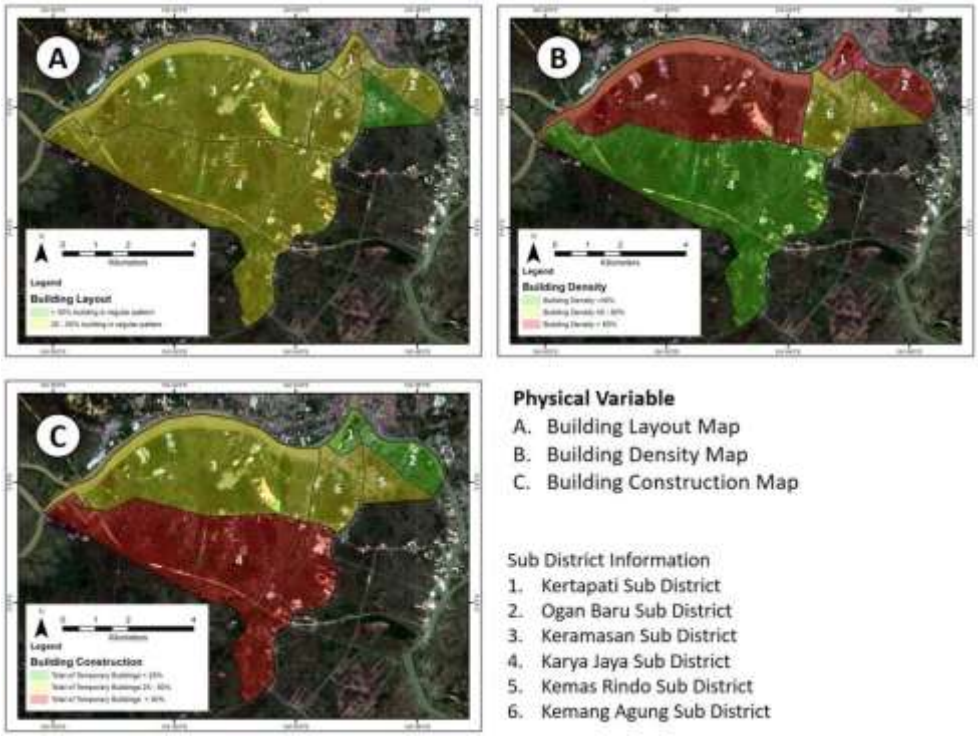

Figure 2 Physical Building Variables Map

Identification of building layout indicators is carried out based on image interpretation by taking into account the characteristics of the building's shape. The regularity of the position of the building against other buildings and the surrounding environment in a settlement describes the type of building layout. The type of building layout is divided into two, namely regular buildings and irregular buildings. Settlements with regular houses facing (facing the same direction), different building areas and different shapes can be said to have 25-50% regular buildings. Furthermore, for settlements with regular buildings above 50%, it is marked by the presence of regular houses, both in the direction of the building and the area and shape of the building which are relatively the same. Based on the survey results, only Kemas Rindo Sub-district has good building order so that it is included in the type of >50% regular building. All buildings in Kemas Rindo Sub-district face the same street and tend to have a uniform building shape even though not all of the buildings are the same. Meanwhile, buildings in other sub-district other than Kemas Rindo Sub-district have different facing directions. The area and shape of the building are also not the same so it is included in the layout of the building with 25-50% regular buildings.

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Identification of the density indicators of residential buildings in Kertapati District is carried out by interpreting satellite imagery. After that, the settlements will be classified into 3 class categories, namely high density, medium density and rare density according to the scoring results. Density classes are identified by the presence of buildings that are close together so that the roofs of the houses touch and there are few trees and each building does not havea home page. Medium density class is identified by the distance between houses which is quite rare but there are still trees and a narrow yard. Meanwhile, the density class is rarely recognized from the sparse distance between houses and there is a yard that is wider than the house building so that there are many trees around the building environment. Kertapati and Ogan Baru Sub-districts are settlements with very dense building density. Only a little sunlight is able to penetrate the neighborhood around the residential area because the high density makes the distance between houses close to each other and the roofs of the houses touch. Settlements in Keramasan Sub- district also have a high density, but the distribution of settlements is concentrated only in a special location for settlements, while the rest of the area is still in the form of vacant land or wild forests.

In terms of building construction indicators, the houses of residents in Kertapati and Ogan Baru Sub-districts are mostly made of brick/concrete which indicates that permanent buildings are more dominant than temporary ones. Therefore, the construction of buildings in the settlements of Kertapati and Ogan Baru Sub-districts is classified as a temporary building area of 25-50%. Construction of buildings in Kemang Agung, Kemas Rindo and Keramasan Sub-districts have buildings made of wood and brick/concrete so that not all buildings are temporary. There is a dominant type of stilt house made of wood and a house that usually uses brick/concrete as aconstituent of the walls so that the three sub-districts are classified as <25% temporary building areas. Furthermore, the types of houses in Karya Jaya Sub-district are usually in the form of wooden houses on stilts and built on swamps so that the settlements in this sub-district are classified as temporary building areas >50%.

Facilities and Supporting Infrastructure

The variables of Facilities and Supporting Infrastructure consist of several indicators, namely Clean Water Infrastructure, Waste infrastructure, Drainage infrastructure, Neighborhood Road Infrastructure, Sanitation Infrastructure. The following is a map describing these indicators:

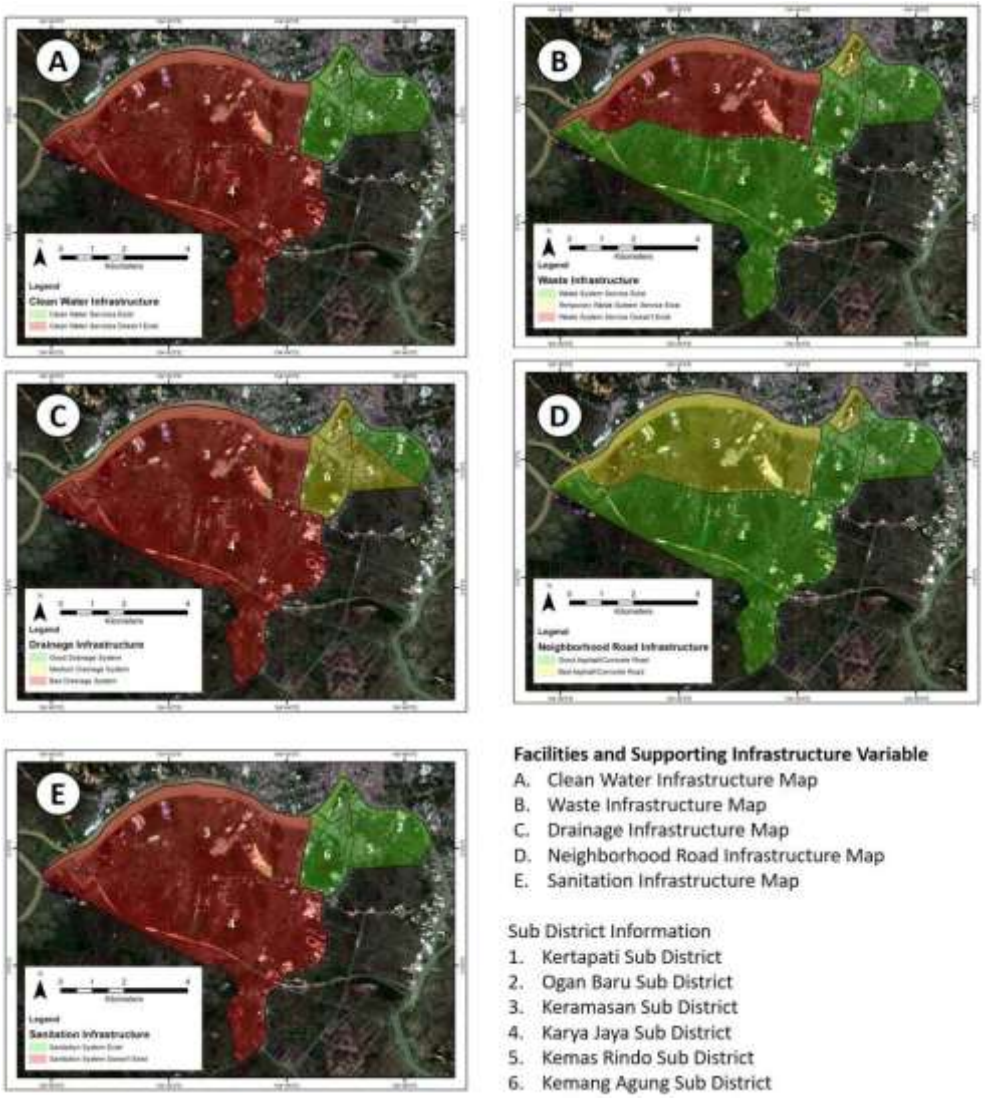

Figure 3 Facilities and Supporting Infrastructure Variables Map

Indicators for Clean Water Infrastructure in the Sub-districts of Kertapati, Ogan Baru, Kemas Rindo and Kemang agung has been facilitated by clean water services because the majority of houses in the settlements have been reached by Regional Drinking Water Company (PDAM). In addition, there are also several houses of residents who already have their own wells or boreholes. Therefore, the four sub-district are marked in green on the clean water infrastructure map, which means that the area already has a clean water piping system. In Keramasan Sub-district, most residents use river water for household purposes rather than water from the piping system because the clean water piping system has not yet reached a large area in Keramasan Sub-district. There are also residents of Keramasan Sub-district who buy clean water from a water depot. In Karya Jaya Sub-district, many residents buy clean water in order to meet their water needs at home because only a few residential areas have been fed by the clean water piping system. In addition, there are several residents' houses that already have their own wells or boreholes. Therefore, it can be concluded that the Keramasan and Karya Jaya Sub-districts tend to be classified as no clean water piping service because the clean water piping system has not covered a large area in the two sub-district.

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Figure 4 Field Survey Documentation

On the indicators of Waste Infrastructure, the majority of residents living in Kertapati District dispose of theirwaste independently to temporary landfill which are then transported by the Palembang City Sanitation Service. In Kertapati Sub-district, there are still many residents who littering into the ditch. There is one neighborhood unitwhose residents choose to collect waste in a special vacant land and then burn it on the land so that the waste infrastructure in Kertapati Sub-district is classified as a class with a temporary waste system. In addition, residentsin Keramasan Sub-district do not use the services of the Palembang City Sanitation Service, residents immediatelythrow their household waste into rivers around the settlements so that they are classified as class there is no waste system services. In other sub-districts, there are already waste system services, so overall other sub-districts apart from Kertapati and Keramasan Sub-districts already have adequate waste system services.

In the Drainage Infrastructure indicator, Ogan Baru Sub-district is included in the good class because all residential areas already have drain. The flow of water in the drain is also smooth, only a little trash is found that clogs the channel. For Sub-districts Kertapati, Kemas Rindo and Kemang Agung have a medium level drainage system because not all areas in the three sub-district have good drainage. There are areas where the drainage flow is blocked by trash and areas where there is absolutely no drainage so that these three sub-districts are prone to flooding when heavy rains are pouring down on them. There is a poor drainage system in Keramasan and Karya Jaya Sub-districts. In these two sub-district, only a few residential areas have drain. The majority of settlements in the Keramasan and Karya Jaya Sub-districts build their houses on rivers or swamps, so that there is no drainage

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infrastructure available and residents directly drain their household wastewater into rivers or swamps around the place where they live. Therefore, Keramasan and Karya Jaya Sub-districts are marked in red on the drainage infrastructure parameter map, which means they have a poor drainage system.

Furthermore, on the Neighborhood Road Infrastructure indicator, neighborhood road are defined as roads thatconnect between activity centers within the sub-district area. The results of the field survey show that the Sub- districts of Ogan Baru, Kemas Rindo, Kemang Agung and Karya Jaya already have good road accessibility around their areas although there are still some cracked roads and potholes. Neighborhood road around settlements in Kertapati and Keramasan Sub-districts have mostly been paved with asphalt, but there are also neighborhood roads that have not used asphalt pavement. However, many neighborhood roads in the two sub-districts have potholes so that Kertapati and Keramasan Sub-districts are classified as asphalt/concrete roads with potholes. Meanwhile, the Sub-districts of Ogan Baru, Kemas Rindo, Kemang Agung and Karya Jaya are classified as asphalt/concrete roads with good condition because only a few holes or cracks were found on the neighborhood roads. The betterthe condition of the residential road surface, the better quality of the settlement will be in the sanitation infrastructure indicator, based on the results of the field survey, Keramasan Sub-district is dominated by houses of residents who do not have septic tanks. The wastewater treatment system in Keramasan Sub-district is not in accordance with technical standards because the waste water from the household is directly channeled into the river. This is due to the location of the residents' houses which are usually built on a river. Thedrainage infrastructure at the Karya Jaya Sub-district is similar to that of the Keramasan Sub-district, in that most residents do not have a septic tank and directly dispose of their household wastewater into nature. The only difference is where the wastewater is disposed of. Keramasan Sub-district disposes of their household wastewaterdirectly into the river, while Karya Jaya Sub-district disposes of their household wastewater directly into the swamp because many people's houses are built on swamps. Therefore, Keramasan and Karya Jaya sub-districts belong to the class without a sanitation system. Meanwhile, in other sub-districts in Kertapati District, all the houses of the residents already have private toilets equipped with septic tanks so that they are classified as having a sanitation system. In addition to private toilets, there are also public toilets equipped with septic tanks such as inKertapati Sub-district.

Land Ownership

The Land Ownership variable consists of two indicators, namely Land Legality Status and Land Ownership. The following is a map describing these indicators.

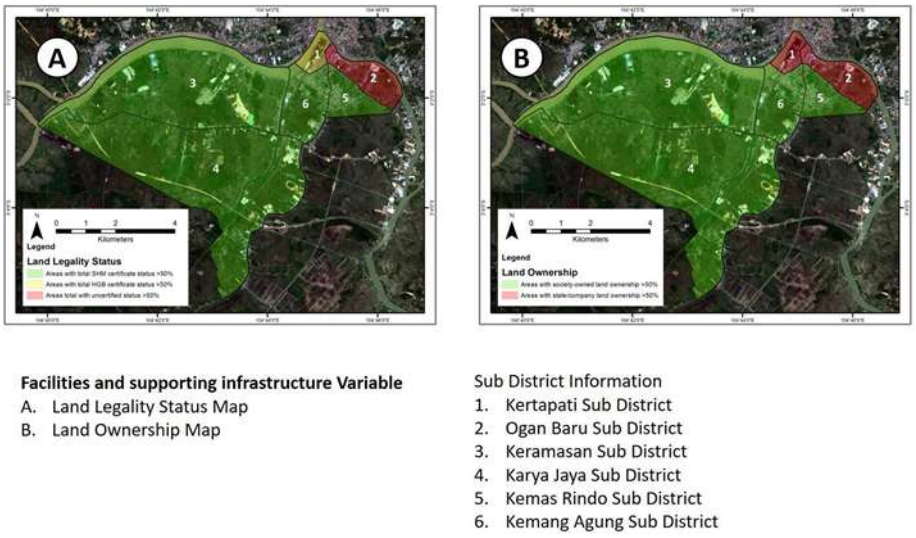

Figure 5. Land Ownership Variables Map

In the indicator of Land Legality Status, Kertapati Sub-district is dominated by house buildings with Building Use Rights (HGB) certificates because actually all land in Kertapati Sub-district belongs to PT Kereta Api Indonesia (Persero) or commonly referred to as PT KAI. So, on the map of the legality status of the Kertapati Sub- district, it is marked in yellow which means the area with the number of HGB certificate statuses is >50%. Meanwhile, in Ogan Baru Sub-district, there are many residents who do not have certificates and there are areas belonging to PT KAI and PT Prasidha Aneka Niaga (PT PAN) so that Ogan Baru Sub-district is an area with >50% uncertified status. Apart from Kertapati and Ogan Baru sub-districts, other sub-districts such as Kemang Agung, Kemas Rindo, Keramasan and Karya Jaya sub-districts are dominated by privately owned houses that have been certified, although there are some buildings that are not certified, so they are included in areas with certificate status (SHM) >50 %.

Furthermore, Land Ownership indicators, based on the results of field surveys, land ownership in the settlements of residents of Kertapati and Ogan Baru Sub-districts are on average owned by the state. All land in Kertapati Sub-district is owned by PT KAI so that it is classified as an area with state/private land ownership > 50%. Residents in Kertapati Sub-district only have the right to build on the buildings that were erected and are required to pay Land and Building Tax (PBB) per year of Rp. 25,000. In Ogan Baru Sub-district, there is a PT PAN area, but not all of it. It can be concluded that Kertapati and Ogan Sub-districts are new areas with state/private land ownership >50%. Land ownership in the residential areas of Keramasan, Karya Jaya, Kemas Rindo and Kemang Agung Sub-districts is classified as an area with <50% state/private land ownership because not all land is owned by state/private companies. This area is dominated by buildings built on privately owned land.

Settlement Slum Level of Kertapati District

A map of each indicator that has been described produces a map of the level of slums in the District of Kertapati. The following is a map of the slum levels of each sub-district in the Kertapati.

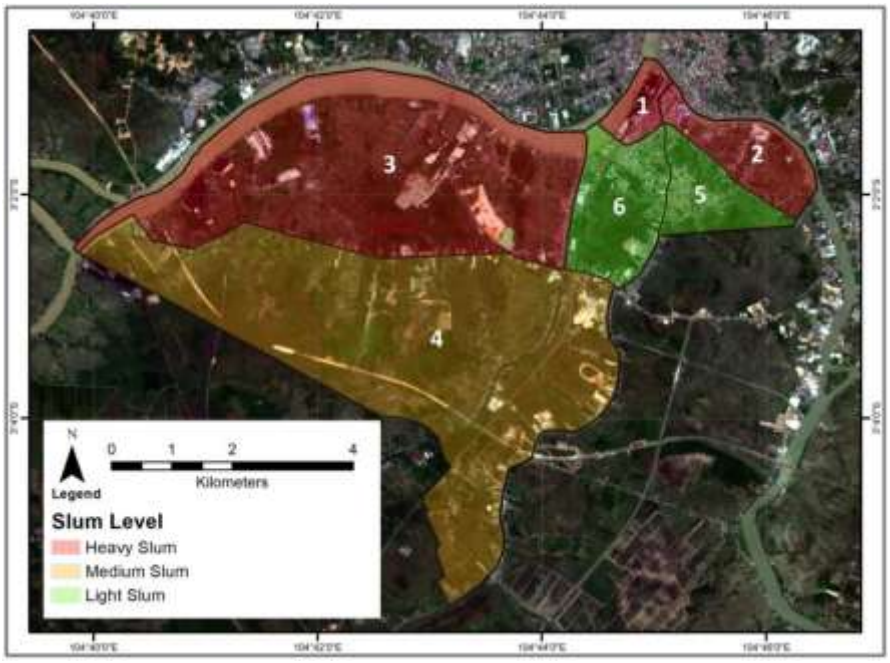

Figure 6. Kertapati District Settlement Slum Level

In general, the level of slums in the settlements of Kertapati District is still dominated by the level of heavy slums in 3 sub-districts namely Keramasan, Kertapati and Ogan Baru which cover 52.53% of the total area of Kertapati District. Meanwhile, for medium-level slums, only the Karya Jaya Sub-district. then, for the level of light slums, there are Kemang Agung and Kemas Rindo Sub-districts. The details are shown in the following table.

Table 4. Result of Analysis of Slum Level of Settlement in Kertapati District

No	Slum Level	Area (Ha)	Percentage (%)
1.	Light Slum	542	11,51
2.	Medium Slum	1694	35,96
3.	Heavy Slum	2474,3	52,53
	Total	**4710.3**	**100**

Land Management Strategy

Based on the results of the scoring analysis process with overlays, it can be seen the slum characteristics of each sub-district and the level of slums in each sub-district in Kertapati District. The sub-district with the highest slum value will be a new limitation in the next analysis. Based on the conditions and the results of the analysis, the next process will focus on the Keramasan Sub-district as the sub-district with the highest slum score of 44. According to the results of in-depth interviews with the community and the author's analysis based on a questionnaire, it was found that the form of land management formulated for handling slum settlements in

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Keramasan Sub-district, Kertapati District is using the Land Consolidation method, namely the Land Readjustment approach. The choice of this approach is based on 2 considerations, namely:

1. According to the Regulation of Head of the National Land Agency No. 4 /1991 about Land Consolidation, land consolidation is explained as a form of land policy in urban and suburban areas regarding the realignment of land tenure and use in accordance with spatial planning and land acquisition efforts for development purposes in order to improve the quality of the environment with community participation. The legal status and ownership of the residential land is owned by the community, not the state or private so that the method used is the Land Consolidation method. It is different from the Land Sharing method, where the land inhabited by the community is not theirs, but belongs to the state/private sector.
2. Land Readjustment is a land reform process by changing the original location of the land parcels and land use to reallocate irregular lands for use of public facilities as well as those in accordance with urban spatial plans (Yomralioglu, 1993). The Land Readjustment approach was chosen because the financing mechanism for spatial planning in this settlement is assisted by the city government or the private sector, considering that the people here have middle to lower economic levels.

The Land Readjustment approach in Keramasan Sub-district can be done by cutting a portion of the land from each individual plot owner by calculating the percentage taking into account the size and quality of each individual. Using the proportion of 70% for land owners and 30% allocated for the development of basic facilities and infrastructure in residential areas, such as the existence of green open space, clean water infrastructure, neighborhood roads, waste and sanitation. The problems of slum settlements in Keramasan Sub-district are indicated by the condition of high building density, semi-permanent dominant building construction, the absence of clean water infrastructure, the absence of waste infrastructure, neighborhood roads that are still damaged and problems with poor drainage and sanitation infrastructure. In connection with these conditions, the application of the Land Readjustment concept is sought to be able to solve problems in slum areas in Keramasan Sub-district. The expected result from the implementation of Land Readjustment in Keramasan Sub-district is an increase in the quality of community settlements due to the adequacy of basic facilities and infrastructure such as the availability of clean water, waste system services, drainage and sanitation systems, although in the end they have a smaller land area before the implementation of Land Readjustment. However, keep in mind that such results can be implemented properly when there is active participation of the Keramasan Sub-district community together with the Palembang City Government and then integrated into urban planning.

4. Conclusion

The results of research on the quality of settlements in 6 Sub-districts in Kertapati District based on 3 parameters, namely physical buildings, infrastructure and land ownership, it can be concluded that the level of slums in the settlements in Kertapati District is divided into light slum settlements in 2 sub-districts with a percentage of 11.51% of the sub-district. Kertapati, medium slums in 1 sub-district with a percentage of

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35.96% of the area of Kertapati District and heavy slums in 3 sub-districts covering 52.53% of the total area of Kertapati District. This shows that the settlements in Kertapati District are dominated by the heavy class of slums. The sub- district that has the highest slum level is Keramasan Sub-district.

Furthermore, land management recommendations for alleviating the problem of slum settlements in Kertapati District are focused on Keramasan Sub-district, because it has the highest slum level value. To overcome the problem of slum settlements that occur in Keramasan Sub-district, which are generally owned by the community, it is recommended that the appropriate land management strategy is to use the Land Consolidation method with the Land Readjustment approach. Land Consolidation is a form of land policy in urban and sub-urban areas regarding the realignment of land tenure and use in accordance with spatial plans and land acquisition efforts for development purposes in order to improve the quality of the environment with community participation. Through the Land Readjustment approach, namely the land reform process by changing the original location of the land parcel and land use within the area to reallocate irregular urban land for the use of public facilities and settlements in accordance with the urban spatial plan with a proportion of 70% for land owners and 30% for the construction of basic infrastructure for settlements. The financing mechanism for spatial planning in settlements is assisted by the city government or the private sector, considering that the people here have middle to lower economic levels.

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6. References

Badan Pusat Statistik. 2019. Kota Palembang Dalam Angka 2018. Palembang: BPS. Badan Pusat Statistik. 2020. Kota Palembang Dalam Angka 2020. Palembang: BPS.

Ditjen Cipta Karya. 2006. Identifikasi Kawasan Permukiman Kumuh Penyangga Kota Metropolitan. Jakarta: Kementerian Pekerjaan Umum.

Pemerintah Republik Indonesia. 1991. Peraturan Kepala Badan Pertanahan Nasional Nomor 4 Tahun 1991 tentang Konsolidasi Tanah. Jakarta: Sekretariat Kabinet.

Pemerintah Republik Indonesia. 1945. Undang-Undang Dasar Negara Republik Indonesia 1945. Jakarta.

Suprapto, F. A., Annisa, I., Falensky, M. A., Alifiani, R., Rustanto, A., & Putri, D. W. 2021. Evaluation of urban settlement sustainability in an inland municipality in Central Java, Indonesia. IOP Conference Series: Earth and Environmental Science, 771(1). https://doi.org/10.1088/1755-1315/771/1/012018.

Safira, N. A. 2018. Penanganan Kawasan Permukiman Kumuh Kelurahan Sidotopo Melalui Pendekatan Manajemen Lahan. Surabaya: Undergraduate Thesis Institut Teknologi Sepuluh Nopember.

United Nation Development Goals. 2019. “Goal 11: Sustainable cities and communities.” https://www1.undp.org/content/seoul_policy_center/en/home/sustainable-development-goals/goal-11- sustainable-cities-and-communities.html (10 Jan. 2022).

GMPI Conference Series, Vol.2, 2023, pp. 33-47
e-ISSN 2829-0747 DOI. 10.53889/gmpics.v2.171

UNDESA. 2015. Population 2030: Demographic challenges and opportunities for sustainable development planning (ST/ESA/SER.A/389). In United Nations.

Yomralioglu, T. "A Nominal Asset Value-Based Approach For Land Readjustment and Its Implementation Using GIS." https://web.itu.edu.tr/tahsin/PAPERBOX/T01.pdf (3 Jan. 2022).

Yuniawan, R. 2011. Analisis Kondisi Kualitas Lingkungan Permukiman Menggunakan Citra Quickbird di Kecamatan Depok Kabupaten Sleman. Surakarta: Undergraduate Thesis Universitas Muhammadiyah Surakarta.