

Land development directions based on buildings height in Semarang regency

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Abstract. Semarang Regency experienced changes in land use from 2010 to 2020, marked by an increase in built-up areas of 3,681.16 hectares, equivalent to 3.61%. The area of built-up land in 2010 was 13,990.46 hectares, increasing to 17,671.62 hectares in 2020. On the other hand, based on data from the Semarang Regency Central Statistics Agency, the population of Semarang Regency reached 1,080,648 people. Along with the increase in population each year, the limited land area owned by Semarang Regency has led to an increase in demand for land, resulting in land changes. With the increase in built-up areas in Semarang Regency, it is necessary to control the use of built-up space through Land Development Guidelines Based on Building Height in Semarang Regency. The method used is a quantitative method with spatial analysis using a Geographic Information System (GIS). The steps taken to produce Land Development Guidelines Based on Building Height in Semarang Regency are as follows: 1) Identification of Land Cover in Semarang Regency, 2) Identification of Settlement Spatial Planning in Semarang Regency, 3) Analysis of Residential Land Suitability in Semarang Regency, and 4) Land Development Directions Based on Height Buildings in Semarang Regency.

1 Background

Semarang Regency Regional Regulation Number 6 of 2021 Concerning Semarang Regency Medium-Term Regional Development Plan 2021-2026, Capital City Central Java Province with utilise potential area as a safe, comfortable, productive, sustainable and insightful industrial, agricultural and tourism base environment [1]. Based on Semarang Regency Regional Regulation Number 6 of 2023 Concerning Semarang Regency Spatial Planning Plan 2023-2043, objectives from the existence of the Semarang Regency RTRW for 2023-2043, namely realize Regency as buffer capital Central Java Province and its regions growth based industry, agriculture and tourism that are safe, comfortable, productive and sustainable [2]. Semarang Regency has potential featured especially in field industry, agriculture, and tourism. These things due to factors among others, in a geographical manner Semarang Regency is as Buffer Capital Central Java Province, besides it is also apart from area strategic national KEDUNGSEPUR and passed track cross

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national Jogja-Solo Semarang (JOGLOSEMAR) as well as Potential resource natural abundant.

Residential area as wide as not enough more than 22,176 hectares covering residential areas urban as wide as not enough more than 8,072 hectares are all over Subdistricts and Residential Areas rural areas as wide as not enough more than 14,104 hectares are all over Subdistrict. Population growth in each region continues to increase annually; therefore, appropriate population control and management of the demographic bonus are needed to support community welfare and development. Population data results census the population of Semarang Regency in 2023 was 1,080,648 people, with details of 538,117 people men and 542,531 women [3]. It can be seen from group age productive aged 10-35, so that the Semarang Regency area has potential source.

A lower dependency ratio increases the availability of the labor force and accelerates economic growth. Regions that have density or distribution dense settlements that is area center city (subdistrict) Ungaran), the area along Semarang-Bawen corridor and bordering areas direct with the City of Semarang and the City of Salatiga. This is because the area is area objective or overflow resident from the City of Semarang and the City of Salatiga, while the areas that have distribution relatively small settlements No congested namely the sub-district area Bancak and the area where far from center city.

Studies related to land cover address various aspects, including agriculture, environmental conditions, resource management, and natural potential. One that can reviewed from land is development land. Development land done in frame optimize utilization land For increase sustainable productivity in a region [4], there are a number of study previous studies about land development in Semarang Regency. Some among them related with analysis power capacity land settlements in Semarang Regency [5]. In addition to housing, land development is also carried out to support the economy by [6] which examines impact development industry to change use land in Semarang Regency.

There is also research related to tourism development strategies in Semarang Regency, which has great potential and good environmental support, but the implementation of development strategies is still not optimal due to budget constraints, limited human resources, inadequate facilities, weak promotion, and suboptimal technology. Tourism development can be successful by utilizing the driving factors of diverse tourist attractions, the community, and the existing conducive economy [7]. Development land is also studied in terms of aspects agriculture like research conducted [8] on evaluation suitability land for development commodities spices. In addition, [9] conducted a study on agriculture that examined the impact of toll road development on farmers' welfare. On the other hand, [10] conducted a study on growth center theory and its influence on land development, focusing on development strategies for agropolitan areas. This study is novel in that it introduces the concept of spatial development based on verticality (vertical land development) that focuses on Land Development Directions Based on Buildings Height in Semarang Regency.

2 Method

In the research use method Quantitative. Analysis techniques using overlay. Overlay in GIS continues develop through innovation data concepts and modeling spatial. [11]

explains model-oriented data-based overlay method capable objects overcome complexity comparison change between layer polygons. The result is a more overlay flexible can generalize, and efficient in detect change land with using an approximate object model method man observe image (object-based image analysis).

3 Results

3.1 Identification land cover in Semarang Regency

Diversity condition physique nature and geography Semarang Regency is affected on condition cover land. Semarang Regency has type cover varied land, there are area built up consisting of residential and industrial areas, as well as there is non-built-up areas consisting of rice fields, plantations, dry fields, forests, and others. Map Cover Land Semarang Regency in general spatial depicted in map following. The map (Fig. 1.) show that Semarang Regency has 13 classifications cover land based on V3 Technical Specifications for Land Cover of the Information Agency Geospatial. Land cover in Semarang Regency consists of: 1) Industry (79.04 ha), 2) Lakes (1,559.75 ha), 3) Rainforest (2,550.45 ha), 4) Roadways (240.54 ha), 5) Grasslands (323.29 ha), 6) Sand Dunes (8.76 ha), 7) Settlements (18,534.70 ha), 8) Agriculture (30,937.01 ha), 9) Irrigated Rice Fields (11,834.82 ha), 10) Rainfed Rice Fields (13,284.65 ha), 11) Scrubland (3,733.64 ha), 12) Rivers (386.37 ha), and 13) Fields/Farmland (18,382.93) ha.

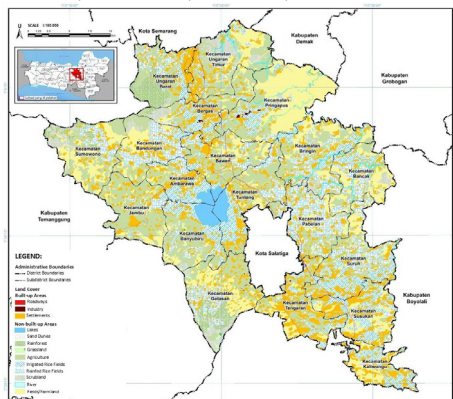


Fig. 1. Land cover in Semarang Regency.

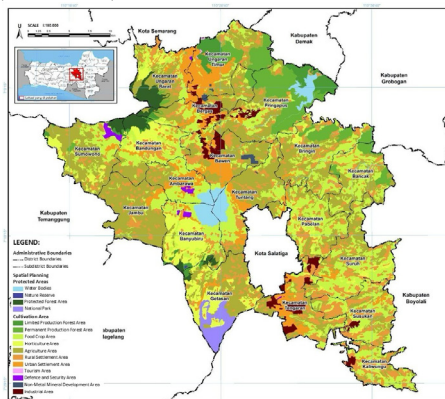


Fig. 2. Spatial planning plan in Semarang Regency.

3.2 Identification settlement spatial pattern plan in Semarang Regency

Spatial Planning is distribution allocation room function protection and function cultivation. The Semarang Regency Spatial Planning Plan is listed in the Semarang Regency RTRW. The map (Fig. 2.) show that Semarang Regency Spatial Plan has type area protected areas (5,869.97 ha) and areas classified cultivation (96,049.23 ha) into 15 areas. Based on the Semarang Regency Spatial Plan map, Semarang Regency has protected areas (5,869.97 ha) and cultivated areas (96,049.23 ha) classified into 15 areas under the Semarang Regency Spatial Plan, consisting of protected areas: 1) Water areas covering

2,560.83 ha (2.51%), 2) Protected Forest Area covering 1,934.67 ha (1.90%), 3) Nature Reserve Area covering 12.32 ha (0.01%), and 4) National Park Area covering 1,362.15 ha (1.34%). In addition, there are cultivation areas covering: 1) Limited Production Forest Area covering 2,279.14 ha (2.24%), 2) Permanent Production Forest Area covering 6,292.41 ha (6.17%), 3) Food Crop Area covering 23,731.38 ha (23.28%), 4) Horticulture Area covering 7,410.59 ha (7.27%), 5) Plantation Area covering 31,166.61 ha (30.58%), 6) Non-Metal Mineral Mining Area covering 214.17 ha (0.21%), 7) Industrial Zone covering an area of 2,347.50 ha (2.30%), 8) Tourism Zone covering an area of 30.01 ha (0.03%), 9) Urban Settlement Zone covering an area of 8,071.16 ha (7.92%), 10) Rural Settlement Zone covering 14,102.40 ha (13.84%), and 11) Defence and Security Zone covering 403.86 ha (0.40%).

3.3 Analysis suitability of residential land in Semarang Regency

Based on Regulation of the Minister of Public Works No.20/PRT/M.2007 concerning Technical Analysis Guidelines Physical and Environmental, Economic and Socio-Cultural in Compilation The Spatial Plan explains that analysis suitability land settlements [12], for know directions suitability land, so that obtained directions suitability allocation land for development area based on characteristics physical. The suitability of settlements (Fig. 3.) is very low (red) in 10 of the 19 subdistricts in Semarang Regency, meaning that development is not possible in parts of West Ungaran Subdistrict, Bergas Subdistrict, Bandungan Subdistrict, Sumowono Subdistrict, Tuntang Subdistrict, Bawen Subdistrict, Ambarawa Subdistrict, Banyubiru Subdistrict, Jambu Subdistrict and Getasan Subdistrict. Moderate (light green) and very high (dark green) settlement suitability among the 19 sub-districts in Semarang Regency, with the smallest area of suitability located in Getasan Sub-district.

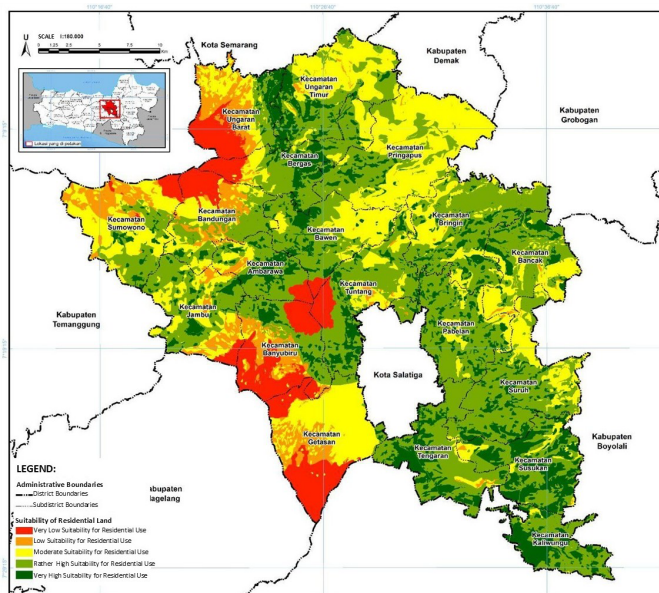


Fig. 3. Suitability of residential land in Semarang Regency.

3.4 Land development directions based on height buildings in Semarang Regency

The development of residential land must consider the characteristics of the land so that residential development can fulfil the rights of citizens to have adequate housing. This must also support the creation of a healthy, safe, harmonious and orderly environment, as well as providing certainty for citizens to settle. Each classification of spatial planning guidelines has development capabilities and values in accordance with Minister of Public Works Regulation No. 20/PRT/M.2007. The following (12) are the classifications of residential land development guidelines: 1) Not for Development has a value of 0-3, 2) Low Development Priority has a value of 4-7, 3) Medium Development Priority with a value of 8-11, and 4) High Development Priority with a value of 12-15.

Based on the map (Fig. 4.) directions development land settlements in Semarang Regency show that results *overlay* can know that there are 4 classifications among them that is Not for developed, priority development low, priority development medium and priority development high. The following are the results of the overlay on the suitability of residential land between the RTRW spatial plan and existing land cover to obtain the results of residential land development direction in Semarang Regency, including Residential Land Development Direction 1) Low Priority covering an area of 377.53 ha, 2) Medium Priority covering an area of 1,555 ha, 3) High Priority covering an area of 2,157,903 ha, and 4) Not for Development covering an area of 14,085 ha. Land development direction High Priority for residential development covers the largest area, namely 2,157,903 hectares, located in 18 sub-districts (green colour) in Semarang Regency. In addition, there is also an area of 14,085 hectares that is classified as Not for Development (red colour), which means that this area is not permitted for residential development.

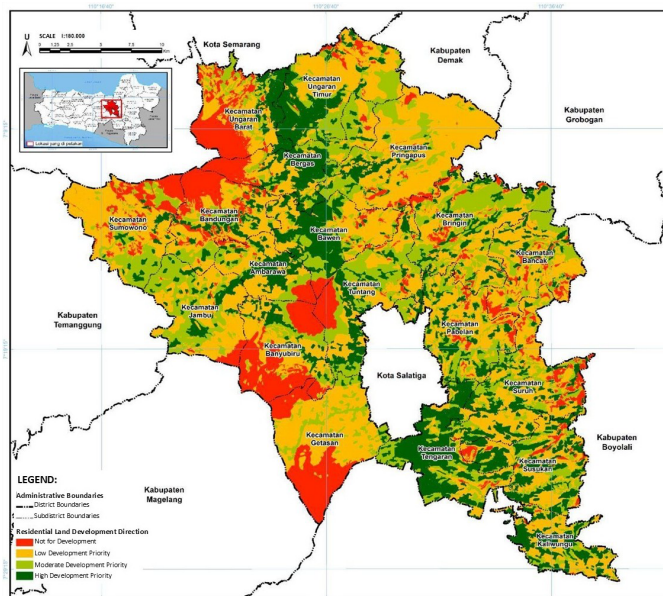


Fig. 4. Residential land development direction in Semarang Regency.

Land Development Guidelines Based on Building Height in Semarang Regency are indicated by considerations of 1) suitability of residential land that is moderately high (light green) and very high (dark green), 2) high-priority residential development guidelines (green), and 3) building height guidelines of 2-4 floors (light green) and >4 floors (dark green) that can be applied in 19 sub-districts in Semarang Regency, with the smallest area in Getasan Sub-district based on the results of the overlay analysis, thus buildings with heights between 2-4 floors and >4 floors can only be applied in specific locations located on the border of Ambarawa District and Salatiga City.

4 Conclusion

Semarang Regency has 13 land cover classifications with a total area of 101,855.94 ha. According to the Spatial Plan, Semarang Regency has protected areas covering 5,869.97 hectares and cultivated areas covering 96,049.23 hectares. The suitability of settlements is moderate (light green) and very high (dark green) in 19 sub-districts in Semarang Regency, with the smallest area of suitability located in Getasan Sub-district, while the High Priority for residential development has the largest area, namely 2,157,903 hectares, located in 18 sub-districts, except in Getasan Sub-district (which has a small area). Therefore, land development guidelines can be allocated to areas with moderately high (light green) and very high (dark green) suitability for residential development, with high priority development guidelines (green). Development guidelines in Semarang Regency are based on building height, with 2-4 floors buildings directed in 19 sub-districts in Semarang Regency and buildings >4 floors directed in a small part of Getasan Sub-district, because Getasan Sub-district has a small area with moderately high suitability located on the border of Ambarawa Sub-district and Salatiga City.

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