

Utilization of land in the river border area in Grogol Sub-district Sukoharjo District in 2018

Munandar Cahya Santoso ^{a,1,*}, Agus Sudargono ^a, Talitha Rahmawati ^a

^a Geography Education, Veteran Bangun Nusantara University, Sukoharjo, Indonesia

¹ munandarcahyasantoso@gmail.com

* Corresponding Author



Received 25 Agustus 2020; accepted 8 September 2020; published 22 Oktober 2020

ABSTRACT

The purpose of this research is to : (1) Knowing the Land Use of River Border Areas in Grogol sub-district; (2) Knowing the types and characteristics of buildings that dominate in the River Border Area, Grogol Sub-District in 2018; (3) Knowing the Suitability of River Border Area Land Use in Grogol Sub-District in 2018 with River Border Regulations. This research uses the google earth remote sensing image interpretation method with Quickbird satellite imagery, which describes and knows land use, types and characteristics of buildings, and land use suitability with boundary regulations. The data collection technique used is through an interpretation of satellite imagery, direct field observation. The data analysis technique used was data reduction, data presentation, concluding / verification. This study's results are : (1) Utilization of land in the river border area in Grogol Sub-District, Sukoharjo District in 2018, Bengawan Solo and Kali Samin rivers, consisting of 5 land uses: is Rice Fields, Garden, House, Empty land, and Factory; (2) The type of land for house buildings with the characteristics of permanent buildings has the most expansive area. (3) Most of the land use is following the Regulation of the Minister of Public Works and Housing Number 28 / PRT / M / 2015, because the use of building land in the river border area is only about 25 percent or about 42 hectares of the 168 hectares of the river border area in Grogol Sub-District in 2018

KEYWORDS

River Border
Land Use
Image Interpretation
Bengawan Solo
Kali Samin river

This is an open-access article under the [CC-BY-SA](https://creativecommons.org/licenses/by-sa/4.0/) license



1. Introduction

The increase in population has led to an increase in housing demand (Eichholtz, P., & Lindenthal, T, 2014). The high demand for housing, less proportional to the area of land available. The community has carried out land use in the riverbank area, which according to the prevailing laws and regulations it is prohibited to build buildings. In the Regulation of the Minister of Public Works and Public Housing Number 28 / PRT / M / 2015, there are rules for the minimum distance of physical buildings in the border areas and river bodies related to river boundaries, river benefit areas, river control areas and former rivers.

The boundary of the river area and the river's benefit area is a river with embankments in the defined river boundary line 3 (three) meters from the edge of the outer embankment. The river outside the city has a boundary distance of 5 (five) meters from the outer embankment edge. The river's border without embankment in the city area is 10 (ten) meters from the edge of the embankment and in the outer city area is 15 (fifteen) meters from the edge of the outer embankment. (Regulation of the Minister of Public Works and Public Housing Number 28 / PRT / M / 2015)

River borders in Sukoharjo District, especially in Grogol Sub-District, have experienced pressure from conversion to artificial land, especially in the form of settlements. The shift of river boundaries into artificial areas needs to be monitored because river boundaries are significant for preserving rivers and residents around river flow. The government has provided directions for determining river boundaries through the Minister of Public Works and Public Housing Regulation Number 28 / PRT / M / 2015



concerning river boundaries and spatial planning. The appropriate boundary width should be determined based on a physical baseline study and specific phenomena in the river boundary area.

This study benefits the government in monitoring the change of land use in Sukoharjo. It is needed to maintain the river's function that can flow without any disturbance by building on its surroundings. It also contributes to the regulation's evaluation process from Minister of Public Works and Public Housing Regulation Number 28 / PRT / M / 2015 concerning river boundaries and spatial planning.

2. Method

This research uses Remote Sensing, and Geographical Information Systems (GIS) approaches by interpreting remote sensing images (Quickbird Satellite Imagery). The research was conducted by examining land use's suitability with the river border rules stipulated in the Regulation of the Minister of Public Works and Public Housing No. 28 / PRT / M / 2015.

The remote sensing method is carried out by visual interpretation to obtain data on land use, building types, building characteristics, and environmental conditions in Grogol Sub-District, Sukoharjo District, Central Java Province. This has several advantages; among others, the data is relatively fast, the validity is reliable, and the technology is relatively affordable (Nones, M, 2020). It is very well used for the study of dynamic river boundaries that need monitoring or monitoring and is part of a spatial-based geographic phenomenon and is expected to be able to study problems. Related to the location of the riverbank area in Grogol Sub-District. The purposive Sampling technique is a non-random sampling technique where Sampling is determined by determining specific characteristics and criteria by the research objectives so that it is expected to answer the problem.

3. Results and Discussion

3.1. Data

Grogol Sub-District, Sukoharjo District is a sub-district where two large rivers flow: Bengawan Solo River and the Samin River (Fig. 1).

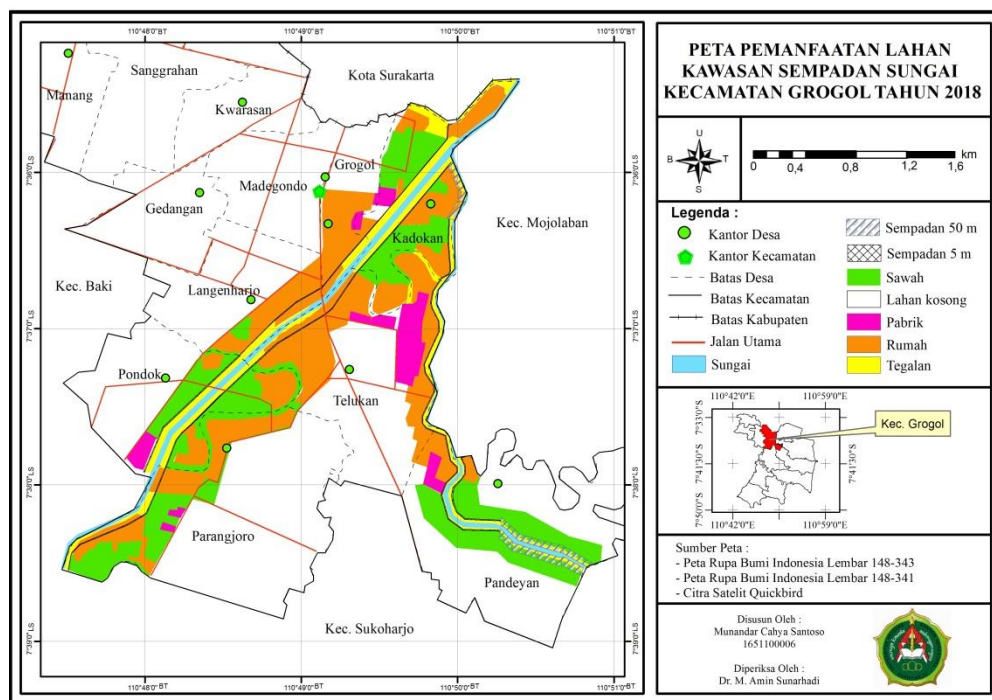


Fig. 1. Map of Utilization of land in the river border area in Grogol Sub-District, Sukoharjo District in 2018

Bengawan Solo River Border Area is located in 6 villages: Kadokan Village, Grogol Village, Telukan Village, Langenharjo Village, Pondok Village, Parangjoro Village. Meanwhile, the Kali Samin border area is located in 3 villages, that is : Kadokan Village, Telukan Village, Pandeyan Village. The land in the river border area in Grogol Suib-District, that is, the Bengawan Solo River and the Samin River, consists of 5 land uses, Rice Fields, Garden, House, Empty land, and Factory that is depicted in Fig. 1.

The type of building that dominates in the riverbank area is the type of house building compared to the type of factory building which is not too many in the riverbank area. The results of the interpretation of Quickbird satellite imagery on the house have tile roof characteristics. Meanwhile, factory buildings have the characteristics of zinc and galvalume roofs. Characteristics based on spatial associations show that houses dominate roadside rather than factory buildings.

The type of house building dominates in the river border area as evidenced by using the purposive sampling technique carried out in 7 villages that pass through the river in Grogol Sub-District. Cottage. And for the type of factory building, only in Kadokan Village and Pandeyan Village, so the results of existing data prove that the type of building that dominates in the River Border Area, Grogol Sub-District in 2018 is the type of house

The characteristics of the types of buildings that dominate the area around the river border based on the results of purposive Sampling of buildings in 7 villages result that buildings with permanent characteristics dominate each village; in other words, the buildings' characteristics have walls. Purposive Sampling was carried out by interpreting Quickbird satellite imagery and field surveys

3.2. Results and Analysis

The results were obtained from the Quickbird Remote Sensing satellite image data observation using the Geographical information system based on the Analysis of the Utilization of land in the river border area in 2018. It was calculated that Border Area, residential buildings, and factories areas in the Size River Border in Grogol Sub-District in 2018 covered an area of ± 168 hectares with ± 117 hectares Bengawan Solo River Border Area and ± 51 hectares in the Kali Samin Border Area.

The results of the calculation of the area of land use for houses and factories in the River Border Area in Grogol Sub-District, covering an area of ± 42 hectares with details of ± 37 hectares in the Bengawan Solo River Border Area and ± 5 hectares in the Kali Samin Border Area which is shown in Fig. 2.

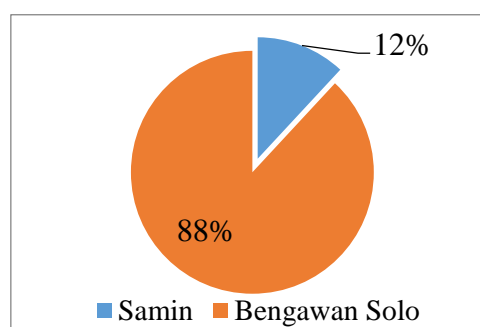


Fig. 2. Area Violating the River Border Area in Grogol Sub-District in 2018

In the Regulation of the Minister of Public Works and Public Housing Number 28 / PRT / M / 2015 Article 8, The borderline of the embanked river outside the urban area as referred to in Article 4 paragraph (2) letter d, is determined to be at least 5 (five) meters from the outer edge. the foot of the embankment along the river channel, then Article 6 paragraph (3) the borderline of the small river without embankment outside the urban area as referred to in paragraph (1) letter b, is determined to be at least 50 (fifty) meters from the left and right banks of the river channel. The ministerial regulation articles are used as references in this research with several considerations, namely by looking at the physical conditions in the River Border Area in Grogol Sub-District.

Based on the results of the Analysis of Utilization of Land in The river border Area in Grogol Sub-District in 2018 and the calculation of the area of the border area and the area of the building area it

included in the River Border Area in Grogol Sub-District with the Regulation of the Minister of Public Works and Public Housing Number 28 / PRT / M / 2015. resulted that most of the Utilization of Land in The River Border Area in Grogol Sub-District in 2018 is in accordance with the Regulation of the Minister of Public Works and Public Housing Number 28 / PRT / M / 2015. in article 22 concerning the Use of the Border area point (e), namely other activities as long as it does not interfere with the function of the river, including the activity of growing vegetable crops, because the use of garden land is quite dominant in the River Border Area in Grogol District in 2018.

Based on the results of the research on the river border area in Grogol Sub-District, this research uses the calculation of the area of the border area and the building area which violates the results of the calculation of the area resulting in most of the land use of around 126 hectares (75 percent) in accordance with regulations and the rest is not in accordance the regulation covering an area of 42 hectares (25 percent) which are house and factory buildings is presented in Fig. 3. The calculation of the area of the border area and the area of the building that violates the border area uses the calculation by calculating the area of the resulting digitization of the Quickbird satellite image interpretation.

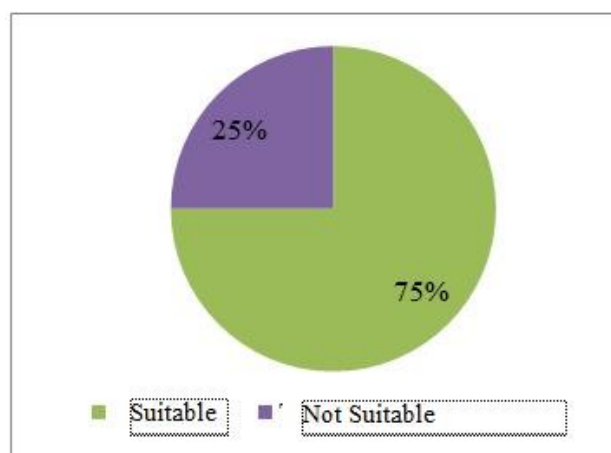


Fig. 3.The suitability of Utilization of land in the river border area in Grogol Sub-District in 2018 with the River Border Regulations

4. Conclusion

In the river border area in Grogol Sub-District, Sukoharjo District in 2018, Bengawan Solo and Kali Samin rivers consisting of 5 land uses, that is Rice Fields, Garden, House, Empty land, and Factory. The type of land use for house buildings with the characteristics of permanent buildings is more dominant. Most of the land use is under the Regulation of the Minister of Public Works and Housing Number 28 / PRT / M / 2015, because the use of building land in the river border area in Grogol Sub-District is only about 25 percent or about 42 hectares of the 168 hectares of the river border area in Grogol Sub-District in 2018.

References

- Eichholtz, P., & Lindenthal, T. (2014). Demographics, human capital, and the demand for housing. *Journal of housing economics*, 26, 19-32.
- Fadhilah Afrizal, 2013, Pemanfaatan Citra Quickbird Untuk Evaluasi Kesesuaian Antara Lokasi Industri Dengan Rencana Tata Ruang Wilayah Tegallega, *Universitas Pendidikan Indonesia*
- Nones, M. (2020). Remote sensing and GIS techniques to monitor morphological changes along the middle-lower Vistula river, Poland. *International Journal of River Basin Management*, 1-13.

-
- Peraturan Pemerintah Republik Indonesia Nomor 38 Tahun 2011 Tentang Sungai
- Peraturan Menteri Pekerjaan Umum Dan Perumahan Rakyat Nomor 28/PRT/M/2015 Tentang Penetapan Garis Sempadan Sungai Dan Garis Sempadan Danau
- Rezki Afrital Rezki, 2014, Penerapan Metode Penginderaan Jauh Dan Sistem Informasi Geografis Untuk Analisa Perubahan Penguunaan Lahan (Studi Kasus: Kawasan Danau Maninjau), *Program Studi Pendidikan Geografi, STKIP PGRI Sumatera Barat*
- Setyadi Anton, (2013) Analisis Keselarasan Letak Bangunan Dan Pemanfaatan Lahan Terhadap Peraturan Sempadan Sungai Menggunakan Citra Satelit Quickbird (kasus sepanjang sungai code, Kota Yogyakarta), *Universitas Muhammadiyah Surakarta, Fakultas Geografi*
- Sunarhadi M A, Suharjo , Anna A. N , Anwar B. S (2015) Penentuan Lebar Sempadan Sebagai Kawasan Lindung Sungai di Kabupaten Sukoharjo , *Universitas Muhammadiyah Surakarta.*
- Sutanto, 1998. Penginderaan Jauh Jilid I. Yogyakarta ; Fakultas Geografi. Universitas Gadjah Mada. *Gadjah Mada University Press.*
- Wiweka, (2013) Standardisasi Klasifikasi dan Simbol Lahan Perkotaan Diturunkan dari Citra Resolusi Spasial Tinggi. *Pusat Pemanfaatan Penginderaan Jauh Lembaga Penerbangan dan Antariksa Nasional*