

Application of geographic information systems in planning forest and land rehabilitation activities in Sukabumi Region III forestry service branch

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Abstract. The application of Geographic Information Systems (GIS) has become important in various fields, including the forestry sector which is experiencing rapid progress. The Sukabumi Region III Forest Service Branch uses GIS to monitor the distribution of critical land, a significant issue in forestry discussions. GIS allows the visualization of spatial data in thematic maps, making it easier to understand geographical conditions and the problems faced. This report discusses the application of GIS in forest and land rehabilitation planning in Sukabumi, focusing on analyzing the distribution of critical land and preparing rehabilitation planning maps.

1 Introduction

With the development of computer and telecommunications technology advances, the application of geographic information systems (GIS) can now be widely used in various fields, one of which is the forestry sector which has experienced a lot of progress. Geographic information system (GIS) is a tool used for collecting, storing, manipulating, and presenting spatial data on real phenomena on the surface of the earth for a specific purpose [1,2].

The Sukabumi Region III Forest Service Branch is one of the agencies operating in the forestry sector which applies a geographic information system (GIS), one of which is to monitor the distribution of critical land, which is one of the issues that is quite hotly discussed. Because of this problem, the geographic information system (GIS) plays a role in spatial models to be shown digitally in map form. GIS can also convey information in the form of thematic maps so that the condition of an area regarding problems can be presented in the form of a thematic map visualization and can make it easier for users to understand the information conveyed.

For this reason, the authors made a report with the title Application of Geographic Information Systems (GIS) in forest and land rehabilitation planning at Sukabumi Region III Forestry Service Branch. Based on this title, the author discusses the distribution of critical land in Sukabumi based on data that has been collected and a forest and land rehabilitation planning map as one way to reduce critical land in Sukabumi Regency/City.

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2 Material and Methods

2.1 Forest and Land Rehabilitation Planning Activity Methods

- Vegetationally (community forests, agroforestry, making nurseries, planting trees)
- Creating groundwater and water conservation buildings (technical civil)
- The technical civil form is a dam retaining and controlling ravines (Gully Plug)

2.1.1 Data on Farmer Groups in Ciemas District

Table 1. Farmer Group Data

No	Group name	Location
1	KTH Bina Tani	Village. Mekarjaya
2	KTH Mekarsari	Village. Ciemas
3	KTH Harapan Jaya	Village. Girimukti
4	KTH Jaya Baru	Taman Jaya Village
5	KTH Harapan Tani	Village. Cibenda

The following steps and map image results are obtained after obtaining group data, sub-district data that will be prioritized, and the RHL method (Figure 1).

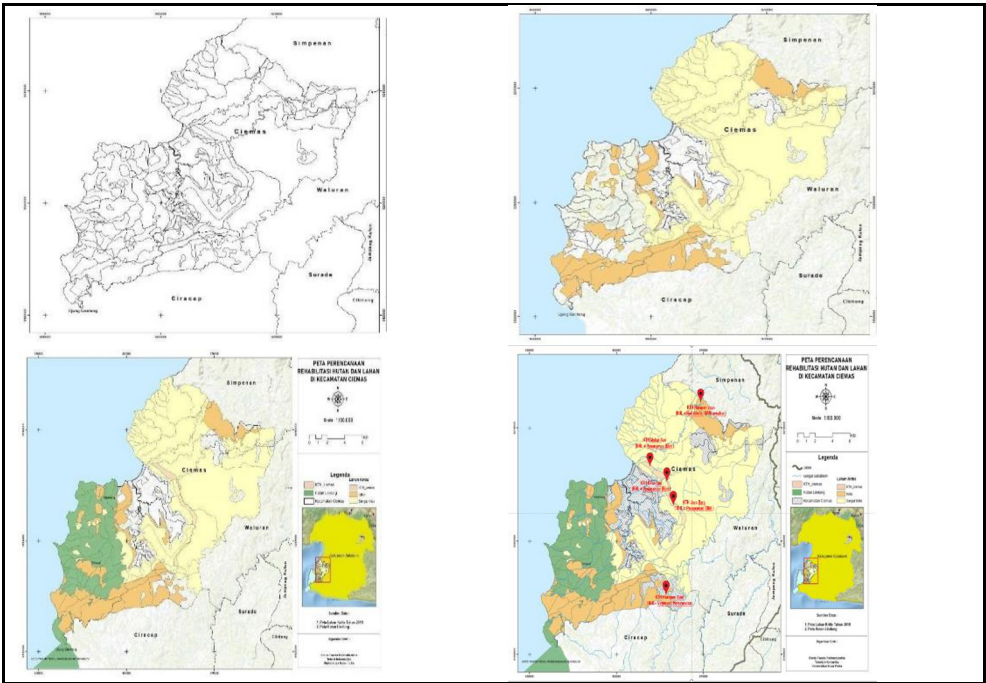


Fig. 1. Forest and land rehabilitation planning map in Ciemas district

3 Results and Discussion

3.1 Understanding GIS (Geographic Information System)

GIS (Geographic Information System) is a system that is booming throughout the world. GIS (Geographic Information System) or what in Indonesian is called GIS (Geographic Information System) is a special information system that manages data that has spatial information (spatially referenced) [3,4]. In a narrower sense, it is a computer system that can build, store, manage and display geographically referenced information, for example data identified by location, in a database. One of the most common products of GIS is maps [5].

Jaya (2002) [6] defines GIS as a computer-based system consisting of computer hardware, software, geographic data and human resources capable of recording, storing, updating, analyzing and displaying geographically referenced information. GIS is a tool, methods and procedures that simplify and speed up efforts to discover and understand the similarities and differences that exist in the earth's surface [7]. The ability of GIS to predict land availability cannot be separated from the added value of GIS in carrying out spatial analysis functions. According to Prahasta (2005) [8], GIS has 4 main components in carrying out the process, namely: (1) data input, as a component tasked with collecting and preparing spatial and attribute data from various sources and responsible for transforming the data into the format requested by the software, both from analog data and digital data, (2) data management, as a component that organizes spatial and non-spatial data into a database so that it is easy to call, update and edit, (3) data manipulation and analysis, as a component that manipulate and model data to produce information in accordance with the objectives, and (4) output data, as a component that functions to produce output for all or part of the database in either printed or digital form

One of the companies operating in the field of Geographic Information Systems (GIS) software is ESRI (Environment Systems Research Institute). This company, which is based in Redlands, California, USA, was founded in 1969. ESRI's products were originally ArcInfo and Arc View, but this software has been refined over time into ArcGIS. According to ESRI, GIS is an organized collection of computer hardware, software, geographic data and personnel designed to obtain, store, repair, manipulate, analyze and display all forms of geographically referenced information.

3.2 Components Used

GIS is formed by interrelated components. There are three important components in GIS that are needed in this practice, namely:

- Hardware (hardware)
- CPU (Central Processing Unit): the computer's main device for processing all instructions and programs
- Computer
- Disk drive: part of the CPU to start a program
- Printer: a tool for printing data and maps
- Software (software)

Software, namely GIS components in the form of GIS work support programs such as data input, data processing, and data output. An example of GIS software is ArcGis. 10.8 which will currently be used for spatial analysis processing.

- Human (User\Brainware) is the implementer responsible for collecting, processing, analyzing and publishing geographic data.

3.3 Necessary data

- Sukabumi admin map which already contains data in its attributes.
- Contour map
- Road map in Sukabumi district
- Maritime boundary map
- Data on critical land for Sukabumi Regency and City
- West Java admin map

3.4 Making a Map of Critical Land Distribution in Sukabumi Regency

Based on data from the Sukabumi administrative data table combined with the Sukabumi Regency Critical Land data table, the results obtained are a map of the distribution of critical land in Sukabumi Regency with A3 paper layout size, scale 1: 300,000, consisting of 4 layers and followed by a legend printed on the map, data frame Critical Land of Sukabumi Regency and City, map coloring rules in accordance with the regulations of the director general of forestry planning and environmental management regarding technical instructions for drawing and presenting environmental and forestry maps. This data was processed using Arc GIS software version 10.8 and using the Geoprocessing method to obtain steps. and the resulting map image is as follows Figure 2.

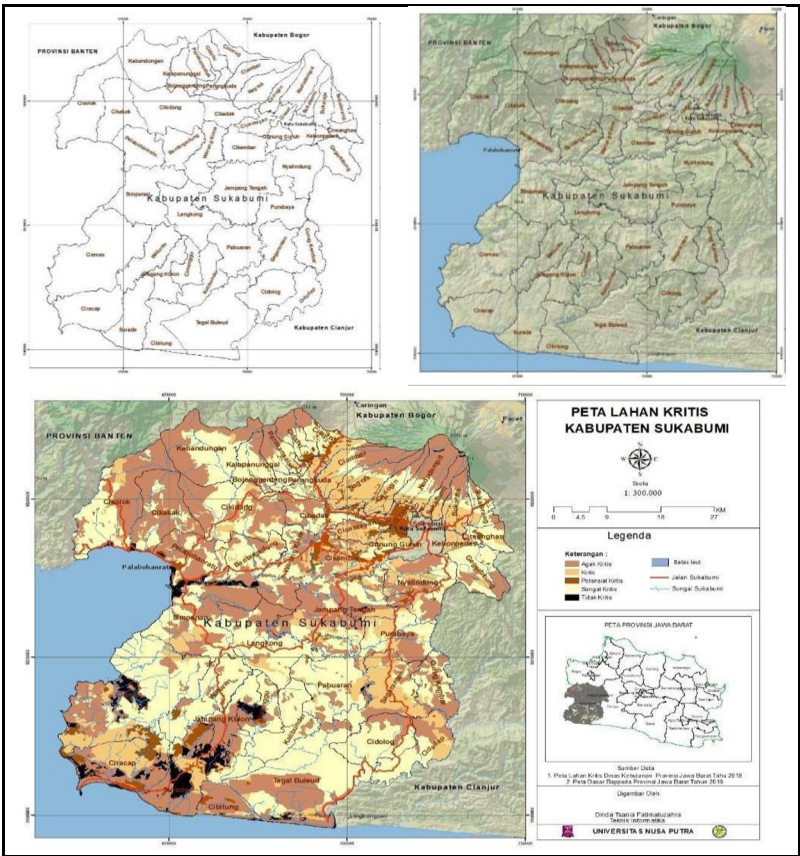


Fig. 2. Map of distribution of critical land in Sukabumi Regency

4 Conclusion

The Geographic Information System (GIS) itself is a tool that can be used to manage (input, management, process and output) spatial data or geographically referenced data. It has been proven that geographic information systems (GIS) can be used in the forestry sector to make plans that can be depicted directly by GIS in the form of maps. To build a geographic information system (GIS) in forestry, there are geographic requirements that must be met, starting from collecting land location data which is converted into coordinate data, land area, forest data, and other required data.

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