

## Vegetation Mapping Information System Model Design Of Tambakrejo Village, Jombang District, Jombang Regency

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### ABSTRACT

*The need for vegetation mapping is very necessary at this time because it can make it easier for users to find out the types of plants that exist in each village and their coordinates. In Jombang Regency, there is no system that implements this vegetation mapping system. This research designs the development of web and mobile-based information systems. The tools used for modeling this system are Flowcharts, Entity Relationship Diagrams, Data Flow Diagrams. The software used is Adobe XD to create system designs and MySql as a programming language. From the design of the system that will be made, it will produce a web of geographic information system for mapping vegetation in Jombang Regency.*

**Keywords:** *Geographic Information System; Vegetation Mapping; Adobe XD.*

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### INTRODUCTION

Tambakrejo Village is an example of an urban area located in Jombang District with the highest population density of 6.88 people/km<sup>2</sup> with a population of 12,279 people (Central Bureau of Statistics Jombang, 2020). Geographic Information System (GIS) is an information system designed to work with spatially referenced data or geographic coordinates or in other words a GIS is a database system with special capabilities to handle spatially referenced data (spatial) together with a set of work operations (Binaefsa & Fiqi, 2017).

GIS is the first system in the world and the result of improved mapping applications that have the ability to overlap or overlay, calculate, digitize, support a national coordinate system that stretches over the American continent, enter lines as arcs that have topology and store attributes and information locational in a separate file. The developer, a geographer named Roger Tomlinson was later called "Father of GIS" (Sufaidah & Muhlisin, 2021). Geographic information System (GIS) or Mapping and Geography-Based Information System is a management tool in the form of computer-aided information that is closely related to the mapping and analysis system of everything and events that occur on earth (Ramdani, et al, 2021). GIS technology integrates database-based data processing operations commonly used today, such as data collection based on needs, as well as statistical analysis using distinctive visualizations as well as various advantages that can be offered through geographic analysis through map images (Yaqin et al, 2021). These capabilities make GIS information systems different from other information systems and make them valuable for public-owned companies or individuals for providing explanations of events, forecasting events, and other strategic plans (Sifaunajah & Haryati, 2016).

So far, in Jombang Regency, no one has developed a vegetation mapping system. Therefore, Jombang Regency requires a system that is able to map the distribution of vegetation to facilitate the grouping of biodiversity, utilization, management and mapping of plant coordinates. As well as evaluation of related parties, especially the village government so that they can identify yards in supporting community food security.

To create a vegetation mapping application, a web and mobile-based system design is needed, this application is relatively new which can make it easier for users to see vegetation mapping in Jombang Regency. The purpose of making this system is to make it easier for users to see the types of vegetation that exist in Jombang Regency.

**METHOD**

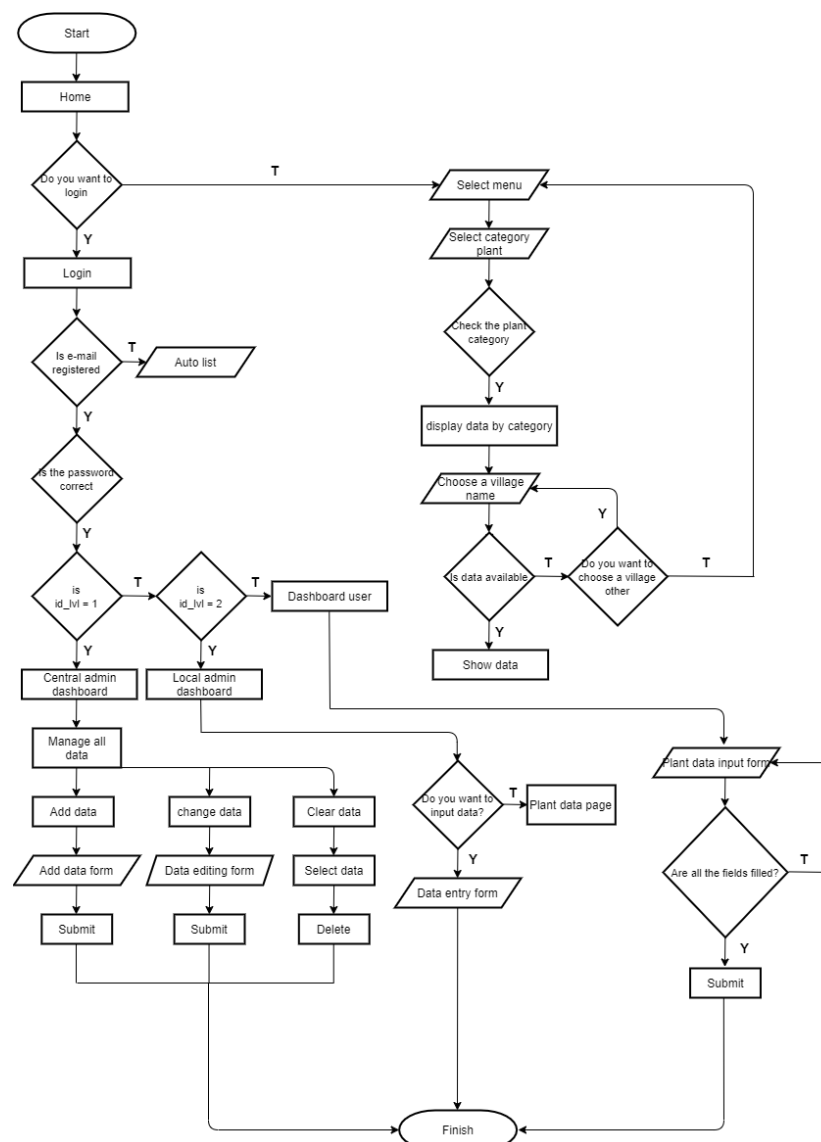
**Data collection technique**

The techniques used in obtaining data are as follows:

- Literature review  
 That is doing a search on the internet for anything related to information systems and geographic information systems so that you can add the required references
- Observation  
 Namely observing the information system on the village web and the Central Statistics Agency of Jombang Regency to obtain valid data needed in compiling the final project.
- Experimental Method  
 From the results of the survey and observation, the author tries to design an information system program that is in accordance with the desired data processing.

**Process flow in Software**

Flowchart is a graphical representation of an algorithm or procedure to solve a problem (Rahman & Santoso, 2015).

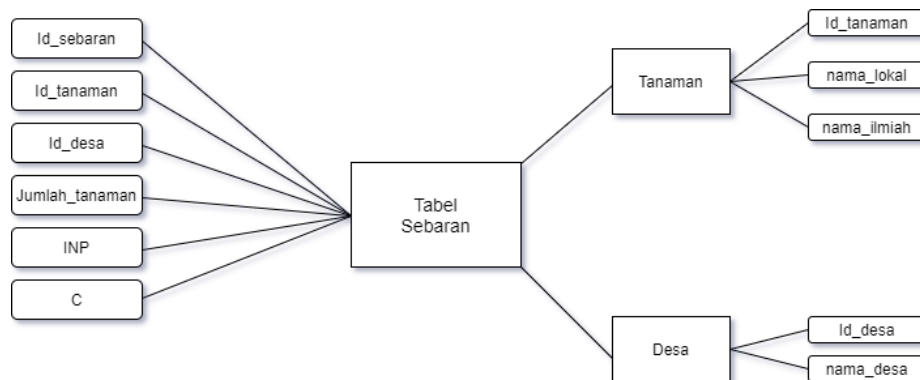


**Figure 1. System Flowchart**

**ERD (Entity Relation Diagram) Design**

Entity Relationship Diagram is a network model that describes the arrangement of data stored from the system in an abstract way. Entity Relationship Diagram shows the relationship between entities in the system, an entity is a place, an object that all have a common name. Entity Relationship Diagram (ERD) is also a translation relationship that contains the components of a set of entities and a set of

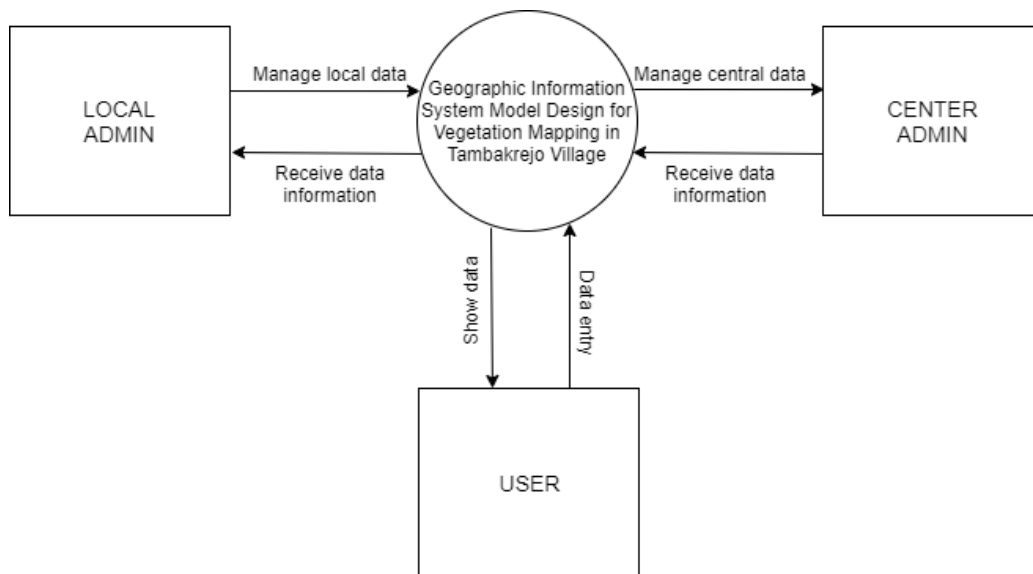
relationships equipped with attributes connecting these entities using the key field (Primary Key Attribute) of each entity (Putra, 2019). Geographic Information System Model for Vegetation Mapping in Tambakrejo Village.



**Figure 2.** Entity Relation Diagram

**DFD (Data Flow Diagram) Design**

DFD (Data Flow Diagram) is a network that describes an automated or computerized system, manualization, or a combination of the two, the depiction of which is arranged in the form of a collection of interconnected system components according to the rules of the game (Ambarita, 2018)



**Figure 3.** Data Flow Diagram.

**RESULTS AND DISCUSSION**

This research produces a geographic information system design for vegetation mapping. The design of this system serves to provide an initial overview of a web in order to facilitate the makers. There is a central admin section that can input, delete, edit, manage all data and a local admin who can only input, delete, edit, and manage data per village.

## Result

- Main Page

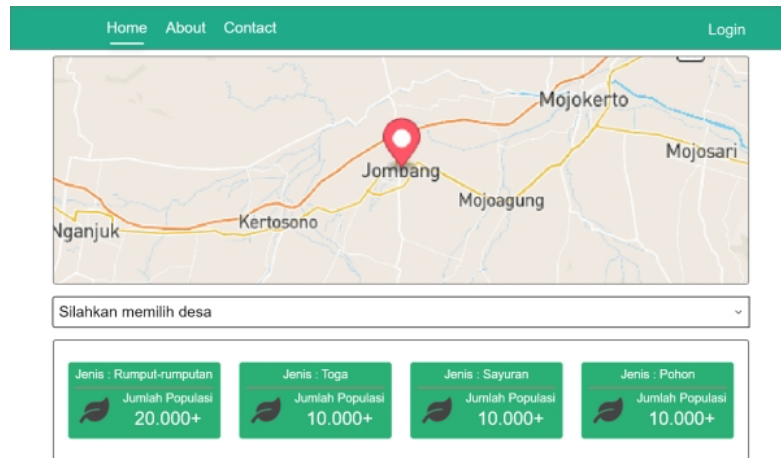


Figure 4. Main Page

This main page is the page when the user first visits the Puspeta website. On this page there is a dashboard to see the types of plants that have been grouped by category (Figure 4).

- Display of crop coordinates

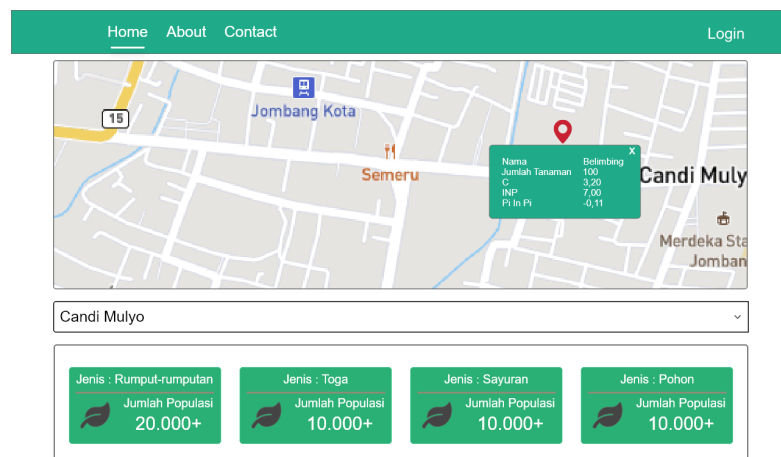
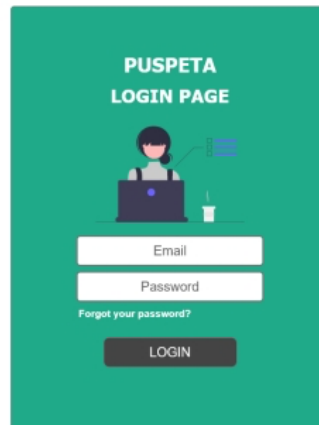


Figure 5. Display of crop coordinates

On this page the user can see the location of the plant coordinates and when the coordinates button is clicked it will display plant data (Figure 5).

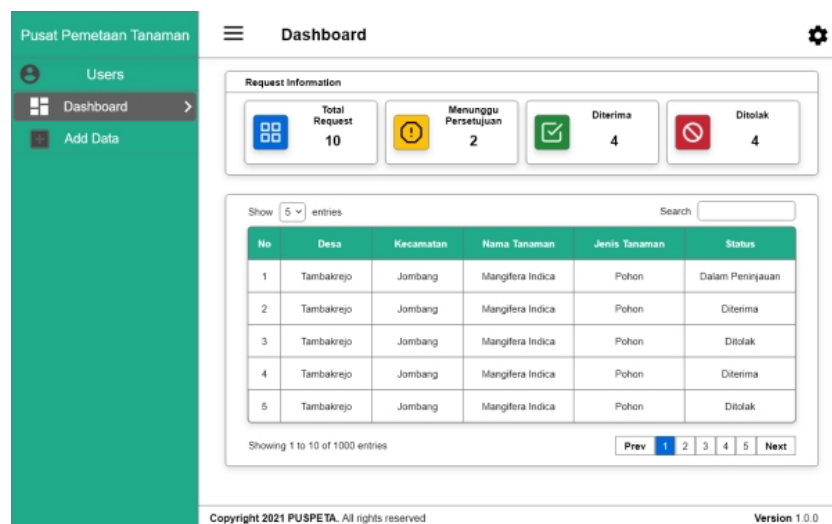
- Login Page



**Figure 6.** Login Page

On this page, if the user wants to input a new plant type, he must first log in (Figure 6).

- User Dashboard Page



**Figure 7.** User Dashboard Page

If you have logged in, the user will be displayed with a dashboard page, on this page the user can see data that has not received approval because if: the user wants to enter a new type of plant, the plant cannot be displayed on the web directly before getting approval from the admin (Figure 7).

- Add Data Page User

Pusat Pemetaan Tanaman

ADD DATA

Form Input Data Tanaman

Nama Tanaman

Jenis Tanaman

Desa

Kecamatan

Lintang

Bujur

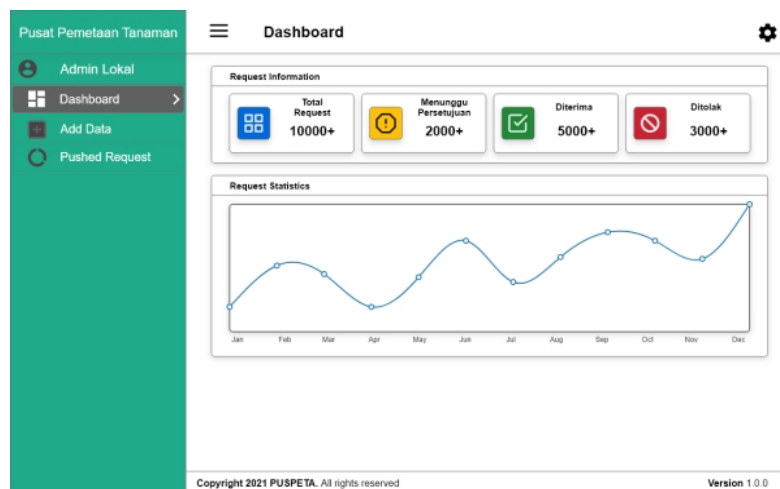
CANCEL SUBMIT

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**Figure 8.** Add Data Page User

If the user wants to enter a new type of plant, the user can switch to the add data page and can enter plant data according to the category, village and location of the user's coordinates (Figure 8).

- Local Admin Dashboard Page



**Figure 9.** Local Admin Dashboard Page

On this website page there is a dashboard page that displays the total approval requests. This local admin is managed by each village, so the admin can only see the request data for each village that he holds. Local admins can also input new plant types on the add data page. (Figure 9).

- Add Local Admin Data page

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**Figure 10.** Add Local Admin Data page

The Add Data page on the local admin contains the same content as the central admin but is different from the user. The difference is from the column for the number of plants, INP and C which can only be filled in by local admins and central admins (Figure 10).

- Pushed Request Page

No	Email	Desa	Nama Tanaman	Jenis Tanaman	Aksi
1	admin@admin.com	Tambakrejo	Mangifera Indica	Pohon	✓ ✗
2	admin@admin.com	Tambakrejo	Mangifera Indica	Pohon	✓ ✗
3	admin@admin.com	Tambakrejo	Mangifera Indica	Pohon	✓ ✗
4	admin@admin.com	Tambakrejo	Mangifera Indica	Pohon	✓ ✗
5	admin@admin.com	Tambakrejo	Mangifera Indica	Pohon	✓ ✗
6	admin@admin.com	Tambakrejo	Mangifera Indica	Pohon	✓ ✗
7	admin@admin.com	Tambakrejo	Mangifera Indica	Pohon	✓ ✗
8	admin@admin.com	Tambakrejo	Mangifera Indica	Pohon	✓ ✗
9	admin@admin.com	Tambakrejo	Mangifera Indica	Pohon	✓ ✗
10	admin@admin.com	Tambakrejo	Mangifera Indica	Pohon	✓ ✗

Showing 1 to 10 of 1000 entries. Prev 1 2 3 4 5 Next

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**Figure 11.** Pushed Request Page

On the Pushed Request page, the local admin can see all the data entered by the user in each village, and the local admin can approve or reject the data entered by the user if according to the admin the data obtained is invalid. This page is almost the same as the central admin page, the difference is that the local admin can see only user requests for each village, while the central admin can see user requests for all villages in Jombang Regency (Figure 11).

- Web and mobile version of Manage Central Admin Data page

No	Desa	Kecamatan	Nama Tanaman	Jenis Tanaman	Aksi
1	Tambakrejo	Jombang	Mangifera Indica	Pohon	EDIT HAPUS
2	Tambakrejo	Jombang	Mangifera Indica	Pohon	EDIT HAPUS
3	Tambakrejo	Jombang	Mangifera Indica	Pohon	EDIT HAPUS
4	Tambakrejo	Jombang	Mangifera Indica	Pohon	EDIT HAPUS
5	Tambakrejo	Jombang	Mangifera Indica	Pohon	EDIT HAPUS
6	Tambakrejo	Jombang	Mangifera Indica	Pohon	EDIT HAPUS
7	Tambakrejo	Jombang	Mangifera Indica	Pohon	EDIT HAPUS
8	Tambakrejo	Jombang	Mangifera Indica	Pohon	EDIT HAPUS
9	Tambakrejo	Jombang	Mangifera Indica	Pohon	EDIT HAPUS
10	Tambakrejo	Jombang	Mangifera Indica	Pohon	EDIT HAPUS

**Figure 12.** Manage Central Admin Data page

On this page what distinguishes it from the local admin is on the manage data and admin management pages. on the manage data page the central admin can manage all data from all villages and on the admin management page the central admin has the right to reject or approve local admin candidates who will be registered via email (Figures 12).

## Discussion

Based on what the author has made, the resulting result is a geographic information system design that can be accessed from the web or mobile. This system will make it easier for admins and users because it can be accessed anywhere and anytime. The use of this system is to make it easier for users to find out information related to what vegetation exists in an area. Previously, the use of a GIS system has also been carried out at PT Fractal but aims to facilitate the flow of data and reports that exist at PT Fractal (Binaefsa & Fiqi, 2017)

In research conducted by (Kurniawan & Tanjung, 2017), geographic information systems are used to map natural tourist objects in North Sumatra Province, this study provides information in the form of real and clear data and images so that tourists who have never visited the North Sumatra area can find out the location or tourist attraction that is interesting to visit.

## CONCLUSIONS

Based on the results of the analysis, design, and implementation of Geographic Information System then several things can be concluded, including:

- The design of this geographic information system can reduce the difficulty of mapping locations taken from the field, because with this geographic information system user can interact with maps on the web base or mobile.
- The design of this geographic information system can provide information to users regarding the results of the mapping analysis direct.
- The design of this geographic information system can be used as file storage media thoroughly into the database.
- From this application, it will be able to display a map of the City of Jombang, in which there is all vegetation mapping information for each village so that it is easier to see the location of the plant coordinates of each village in the city area.

With restrictions on access rights assigned to the system, processes for knowledge base and database management the rules are only done by the admin.



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