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Geographical Information System of Chocolate Plantation Locations in Berau District Using QGIS Web

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***Abstract*—**The cultivation of cocoa plants in Berau Regency has been carried out traditionally with pre-conflict productivity of 700-800 kg/ha, but after the conflict and attacks PBK (Cocoa Fruit Borer) was reported to be only half. The yield quality is also low due to the pest attack and minimum post-harvest treatment. In addition, farmer institutions to be able to carry out activities in the garden together have not been well formed. According to Development Planning Agency at Sub-National Level of Berau Regency, in 2009 the area of cocoa plants in Berau Regency covered an area of 8,644 ha with a production of 2,362 tons. The area is spread across eight districts. With so many chocolate plantations in Berau regency, it certainly makes buyers or visitors, both from related ninas and individuals, become overwhelmed to find the location of chocolate plantations. Therefore, an application is needed to facilitate the search for location and data about the location you want to visit. Geographic Information Systems (GIS) or also known as Geographic Information Systems (GIS) have recently experienced significant developments along with the advancement of geographic information technology. GIS is a computer-based information system that combines map elements (geographical) and information about the map (attribute data) designed to obtain, process, manipulate, analyze, demonstrate and display special data to complete planning, processing and research problems. With the web-based designed GIS application, it is able to solve problems related to the vast chocolate plantation in Berau.

***Keywords*—** GIS, Chocolate Garden, Berau, Web, QGIS

I. INTRODUCTION

Geographic Information Systems (GIS) or also known as Geographic Information Systems (GIS) have recently experienced significant developments along with the advancement of geographic information technology (Alita et al., 2020; ambarita, 2018; Andriyan et al., 2020; Annugerah et al., 2016; Arif et al., 2015; ARIFIANTO & others, 2015). GIS is a computer-based information system that combines map elements (geographic) and information about the map (attribute data) designed to obtain (Chang et al., 2018), process (Hegemur et al., 2020), manipulate (Nurningsih, 2006; Setiadi et al., 2015; Suhendi & Mardzuki, 2019), analyze (Jatmoko et al., 2015; Khoirunnisa et al., 2019), demonstrate (Hartomo et al., 2014; Lucyana, 2020; Wibowo et al., 2015) and display special data to complete planning (Raharja, 2016), processing and researching problems (Mandowen & Mambrasar, 2021). Chocolate is one of the A superior commodity that has an important role in economic development in Berau Regency (Robi'in, 2008; Rozak, 2021), because in addition to being a source of income for the community, it is also expected to be one of the potential sources of Regional Original Income (PAD) (Irfan et al., 2023; Koperasi, 2015; Rudiyanto, 2017; Sholina, 2017; Susanto, 2018). The cultivation of cocoa plants in Berau Regency has been carried out traditionally with pre-conflict productivity of 700-800 kg/ha, but after the conflict and PBK attacks it was reported that only half of it was left (Koperasi, 2015; Lasena & Ahmad, 2020). The yield quality is also low due to the pest attack and minimum post-harvest treatment (Umagapi et al., 2020). Based on the above problems, this research needs to be designed because for now there is no system of digitizing the mapping of areas Berau Regency, with this system, makes it easier for related parties or the community to find out the location and data of chocolate plantation land owners.

II. METHODOLOGY

In conducting this research, researchers used a research framework as a sequence or process with the aim of making the research conducted more structured (Hamdani & Utomo, 2021; Utama & Noviana, 2022). This research framework can also be used by researchers as a guide in carrying out research activities. Several activities in research can be explained as follows:

a. Literature Study
b. Analysis and Design
c. Implementation

d. Testing
e. Documentation.

III. Result and Discussion

A geographical system is a system designed to capture, store, manipulate, analyze, organize and display all types of geographic data". Geographic Information System for the Location of Chocolate Plantations in Berau Regency Using Web-Based Qgis is designed with web-based technology that forms a program that is composed of a series of programming syntax rewards, one of which is PHP. In the process of application this system requires several components, if all components of the Geographic Information System mapping Chocolate farm installed in computer Entity relationship diagram is a model to explain the relationship between data in a database based on basic data objects that have relationships between relationships. Figure 1 shows the ERD model data structures and relationships between data, to describe them used several notations and symbols.

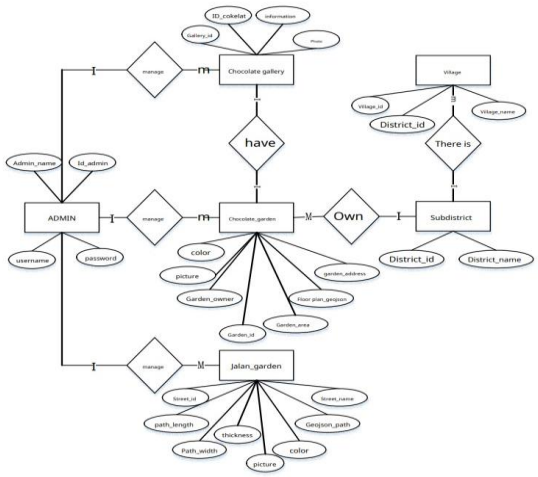

Figure 1. Database

A. Admin Login Page Design

Figure 2 shows admin login page design. This admin login page will later serve to identify admins who will access the admin-only page. The display above is the main page display when the website is run by a user to ensure that this user wants to continue the process further.

Figure 2. Interface Login

B. Admin Home Page Design

The admin's main page is the first page that appears after the admin accesses the login system. The Figure 3 below is a form of detailed information on plantation objects. Where users will get information not only about the existence of objects seen on the digital map provided, but users will also get complete information about plantation objects.

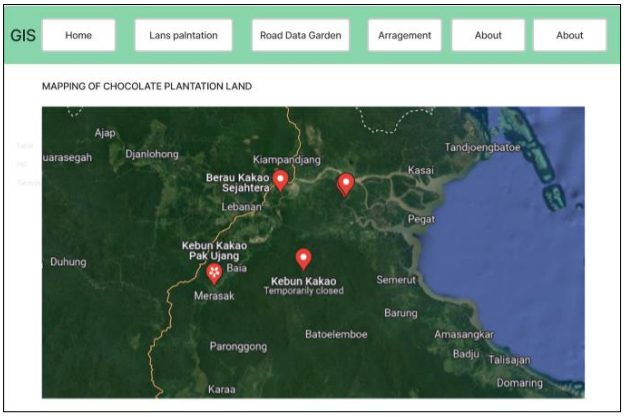

Figure 3. Regency Berau

C. Admin Home Page Design

Manage cocoa farm data Design of manage data page This farm has several menus, namely the garden data input menu, garden data display, plantation gallery input and chocolate plantation gallery display.

D. Chocolate Farm Data Input Design

Figure 4 shows the design of page functioned to input new road data, update data, delete and display road data plantation.

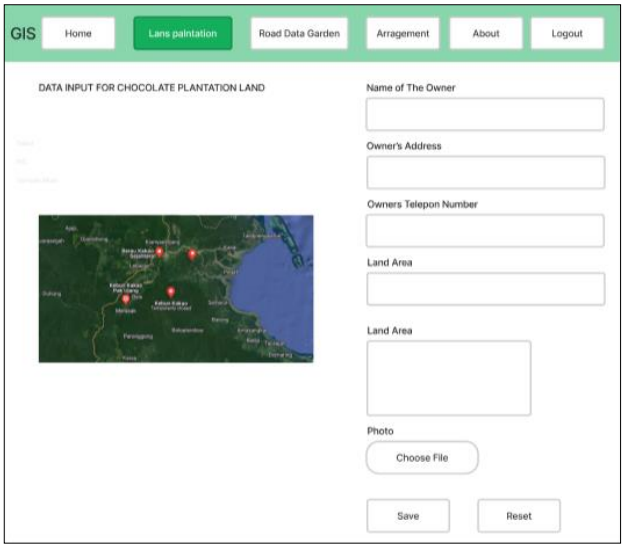

Figure 4. Admin Page Design

E. Design Appears Chocolate Farm Data

The Figure 5 shows design to display data on cocoa plantations in Berau.

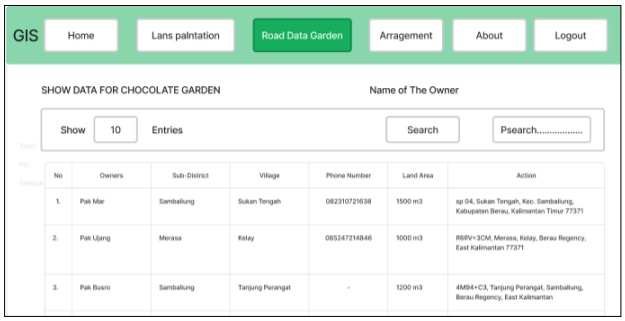

Figure 5. Farm Data

F. Chocolate Farm Gallery Input Design

In this chocolate garden gallery data input design, admins can add photos of other land taken from a certain angle, data that shown in Figure 6.

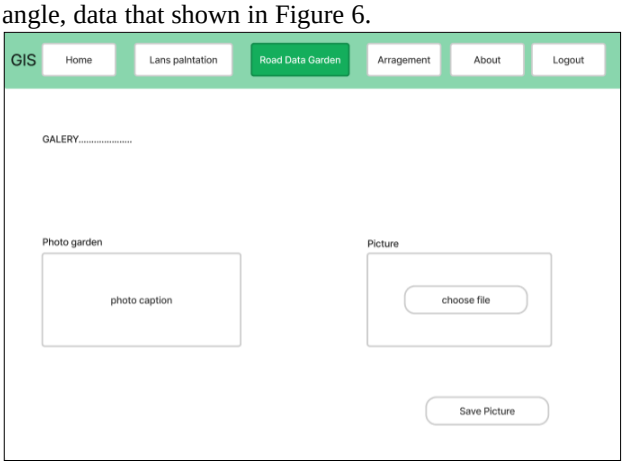

Figure 6. Input Design

G. Page Design Show Data Gallery

Figure 7 shows design of gallery data that display a menu to see gallery data that has been inputted, this page contains photos from different angles grouped by the name of the land owner.

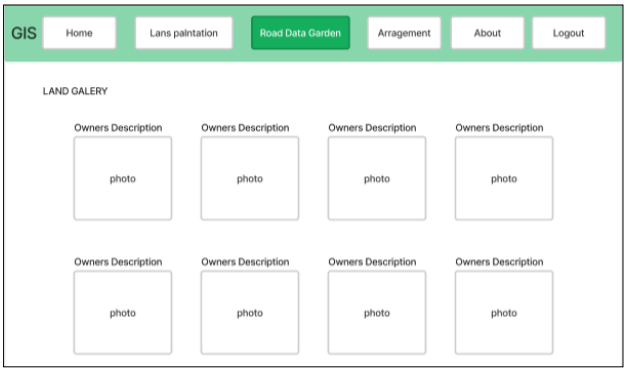

Figure 7. Data Gallery

H. Plantation Road Management Admin Page Design

Figure 8 shows design to input new road data, update data, delete and display plantation road data.

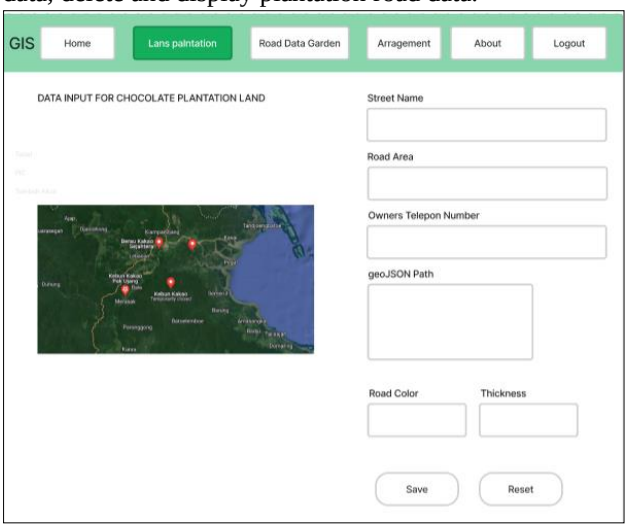

Figure 8. Management Admin Page Design

I. Draft Arrangement Page (Village and Subdistrict)

The Figure 9 shows design of page used to manage village and sub-district data in Berau.

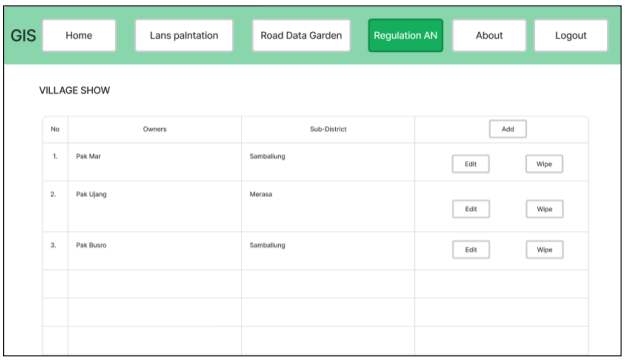

Figure 9. Draft Arrangement Page

J. PDF Report Data Print Page Design

Figure 10 shows design page to print a report on brown land data by the admin.

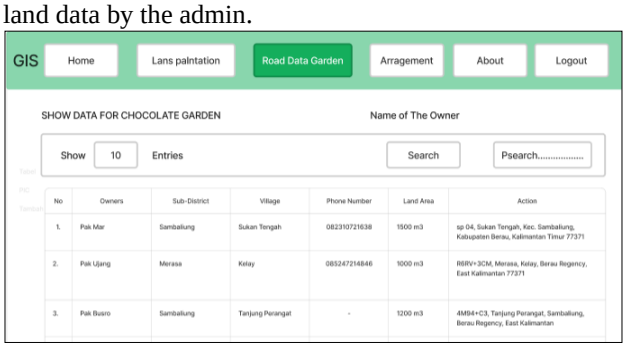

Figure 10. PDF Report Data

3.1. Program Display

A. User Main Page Display

This display is the main page that will appear the first time the user accesses this system.

B. Farm Data User Page View

Figure 11 shows chocolate farm data as well as a view menu to see more clearly the map along with photos of garden land.

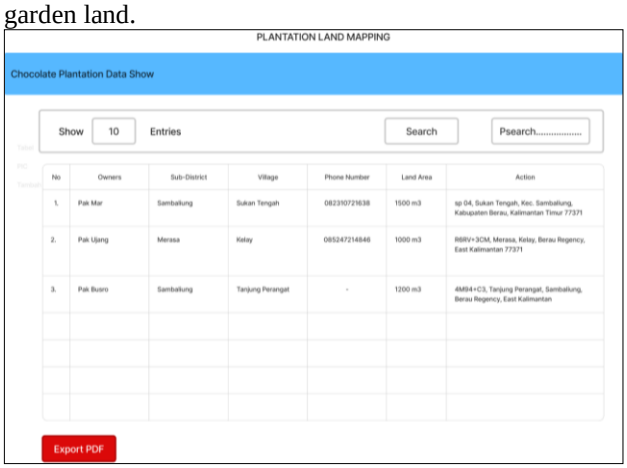

Figure 11. Land Mapping

C. Login Page

Figure 12 shows admin login page that display a working page as an identifying page admin (only for administrators) who will access a special admin page.

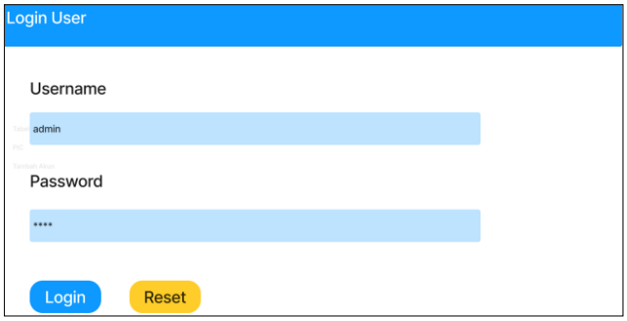

Figure 12. Login Page

D. Admin Main Page View

Figure 13 shows the main page and there is a menu to access data processing pages for information needs. Production Determination List Page.

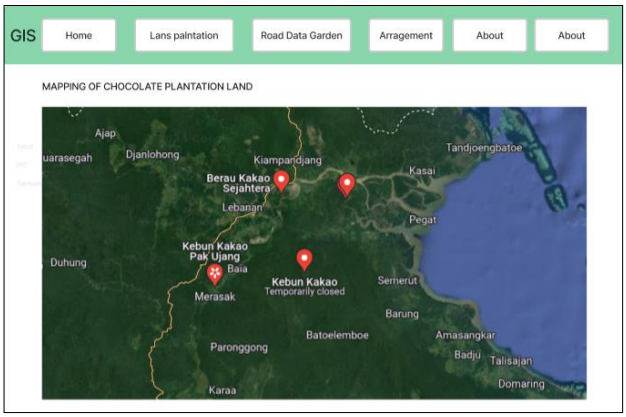

Figure 13. Main Page View

E. Admin Page Display Brown Land Data Input

Figure 14 shows page that function to process additional data, such as the owner's name, cellphone number, area and coordinate points.

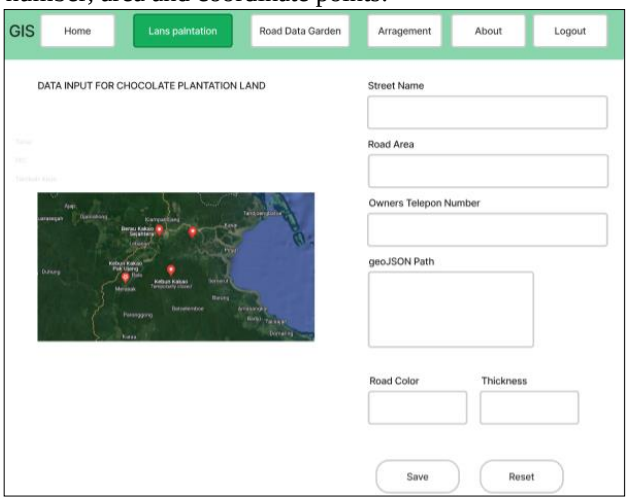

Figure 14. Road Data Garden

F. Admin Page View Farm Data Displays

Figure 15 shows functions to display garden data which has been input into the system.

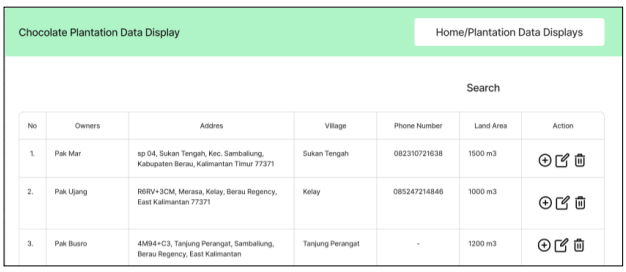

Figure 15. View Farm

G. Admin Page View Show Gallery Data

Figure 16 shows page to view data gallery or photos that have been input.

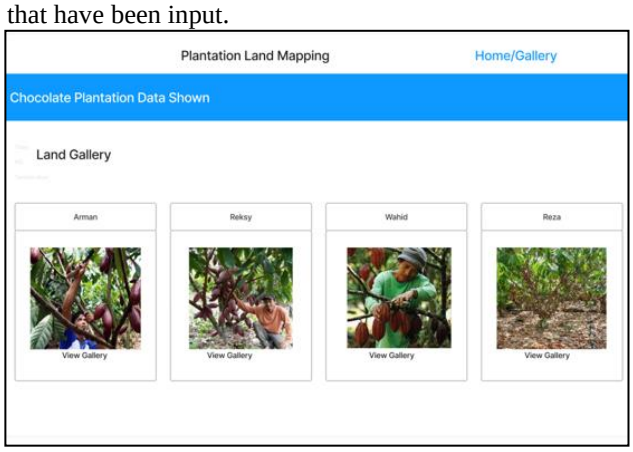

Figure 16. Show Data Gallery

IV. CONCLUSION

This system uses a map processed from the QGIS application. Interactive Maps on information systems geographical map of chocolate plantations using geojson with web based codeigniter framework in this case, the author utilizes the API Google Maps and change data Geojson which is on the map for creation of polygons (garden boundaries) so that the boundaries are clear chocolate garden land. System design using data flow diagram (DFD), meanwhile database design using entity relationship diagram (ERD). Retrieval of coordinate location points using a Garmin GPS GPS device MAP 64s / GPS 64S Garmin MAP by carrying out conservation field to existing sub-districts Berau district. Added security facilities so that The created system cannot be started hacking by someone who doesn't responsible. This website can be developed become more animated with add flash for more interesting. For future development Android based so it's easier for operation.

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