

Distribution of Water Henna Plant Cultivation Farmers (*Impatiens balsamina*) in Jombang Regency Based on GIS

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ABSTRACT

Jombang is one of the regencies located in East Java Province which has an area of approximately 1,159.50 KM². Jombang Regency has a large area of agriculture and plantations. Most of the livelihoods of the people of Jombang Regency are farming. Jombang Regency has many areas of rice fields and plantations that can be excelled to support the economy of its people. One type of commodity that is in great demand in the community is water henna plants. Water henna plants are often found in Jombang Regency. There is little information about water henna plants in Jombang district, so not everyone knows their distribution. Therefore, an application is needed to provide information about the distribution of water henna cultivation farmers in Jombang Regency. GIS (Geographic Information System) is a computer information system that can provide specific geographic information of an area. This study aims to provide data and information about the distribution of water henna farmers in Jombang Regency.

Keywords: Farmer, *Impatiens balsamina*, Geographic Information System

INTRODUCTION

Water henna (*Impatiens balsamina*) is a plant that comes from South Asia and South east Asia and has spread to America since the 19th century. This plant is an annual or biennial plant and has flowers that are white, red, purple, or pink. The shape of the flower resembles a small orchid. The height of this plant can reach one meter with thick but unfused stems and jagged edges (Lestari, 2016). The distribution of water henna plants is mostly found in South Asia and South east Asia, including Indonesia, which has a tropical climate (Habibulloh & Sifaunajah, 2019). In the Jombang area, there are many water henna plants, but there is little information about these plants, so not everyone knows their distribution (Widyastutik & Airlangga, 2022). The distribution of farmers cultivating water henna (*Impatiens balsamina*) in the Jombang area can be known through GIS (Geographic Information System). Sulaksono (2017) said GIS (Geographic Information System) is an information system that aims to present geographic information which includes objects on the surface and in the earth. The Geographic Information System provides information that is tailored to the needs of users of the statistical analysis system using distinctive visualizations and is able to present geographic analysis through map/plan images (Ningrum et al, 2022). These capabilities make geographic information systems different from other information systems and make them valuable for companies to explain events, make event forecasts and other strategic plans.

METHOD

This research is descriptive qualitative which aims to identify the coordinate points of the distribution of water henna farmers in Jombang Regency in order to determine the area of land, farmers' selling price, and length of business. The study was conducted by collecting the data needed to determine the distribution of water henna cultivation farmers in Jombang Regency by directly surveying the geographical location of an area where water henna plants are found. The research was conducted in DukuhKlopo Village, Jombang Regency.

Data collection technique

The data collection technique in this study was by direct observation to the location of agricultural land to determine the required coordinate points. Then do self-introductions and conduct brief interviews with farmers related to the research. From the results of interviews in the field to farmers, several data have been obtained that will be included in the distribution map of henna water plant cultivation farmers in Jombang Regency, including: Name of farmer, age, land area, selling price, length of business and coordinates. With the data that has been obtained, the map of the distribution of water henna farmers in Jombang Regency can be determined by the design model.

System Design Method

GIS (Geographic Information System) design for the distribution of water henna cultivation farmers in Jombang Regency by analyzing the data that has been obtained from the field and then designing the system by adjusting the data to the server using the available programming language. Then do the coding and integrate the data into the database to connect to the server. After all databases have been connected to the server, then a test is carried out on the system whether it is running according to plan or not. If a problem is found, it will be corrected. The following is an illustration of the flowchart of the system design stage of making a distribution map of farmers cultivating water henna plants in Jombang Regency.

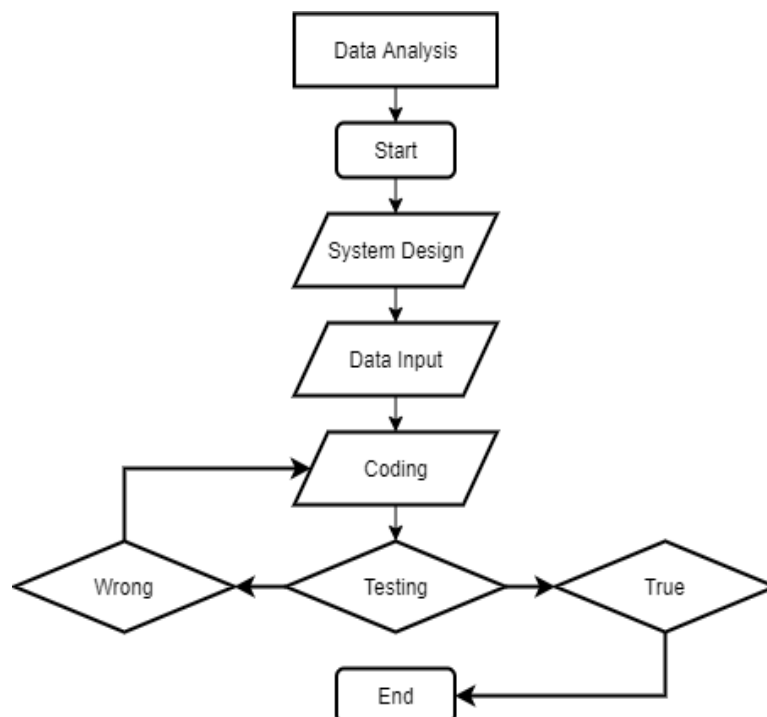


Figure 1. Flowchart of System Design.

RESULT AND DISCUSSION

- In this study, we managed to collect data on farmers cultivating water henna plants in Jombang Regency in Dukuh Klopo Village. Then enter the data into a map of the distribution of water henna plant farmers in Jombang Regency to provide the location and information needed about farmers cultivating water henna plants in Jombang Regency.

Table 1. Data Of Farmers Cultivating Water Henna Plants

NU	FARMER NAME	AGE	LAND AREA (M ²)	SELLING PRICE (KG)	YEAR OF BUSSINES	COORDINATE POINT	
						LATITUDE	LONGITUDE
1	Ms. Ani	46	225	20000	3	-7.51394005	112.2470525
2	Ms. Emi	25	225	20000	10	-7.51609248	112.2819601
3	Ms. Barokah	38	16	20000	5	-7.52579494	112.2470359
4	Ms. Jumilah	44	441	20000	4	-7.5029157	112.2485219
5	Ms. Nawijah	65	16	20000	5	-7.52794013	112.2552695
6	Ms. Indah	35	100	30000	10	-7.513417	112.239239
7	Ms. Sulami	40	225	20000	10	-7.53126938	112.2816646
8	Mr. Didin	33	18	20000	8	-7.51119576	112.2610928
9	Mr. Hariyanto	70	1400	20000	30	-7.5185949	112.2602095
10	Mr. Sunandar	35	3600	20000	15	-7.50808649	112.2545393
11	Mr. Zainul Arifin	39	20	20000	12	-7.49947998	112.2608198
12	Ms. Nurul	32	700	20000	5	-7.49947998	112.2608198
13	Ms. Zety	30	3	30000	1	-7.53827743	112.2598698
14	Ms. Khanifah	40	14	25000	20	-7.508283	112.264668
15	Ms. Tuminah	54	10	30000	20	-7.52488841	112.2751471
16	Ms. Sarah	60	700	30000	9	-7.51046621	112.26789
17	Mr. Kasan	55	900	25000	20	-7.5179192	112.2477213
18	BMr. Sutaji	63	2600	25000	10	-7.517764	112.268367
19	Ms. Sukesi	56	2800	25000	10	-7.50086957	112.2776131
20	Mr. Sunikno	50	7000	25000	30	-7.527963	112.265145
21	Mr. Usman	65	700	30000	8	-7.52026	112.293547

From the results of field research, data from farmers cultivating water henna plants in Jombang Regency in Dukuh Klopo Village along with predetermined data attributes include: Name of farmer, age, land area, selling price, length of business and coordinates

- Farmers distribution maps can be accessed by everyone, both the people of Jombang Regency and people outside Jombang Regency through *web browser*.



Figure 2. Water Henna Farmer Distribution Map.

The map of the distribution of water henna plants in Jombang Regency shows location points and provides information in accordance with the data that has been obtained from the results of research in the field including: Name of farmer, age, land area, selling price, length of business and coordinates. Provide a login menu for admins using email and passwords to process data for farmers cultivating henna water plants in Jombang Regency.

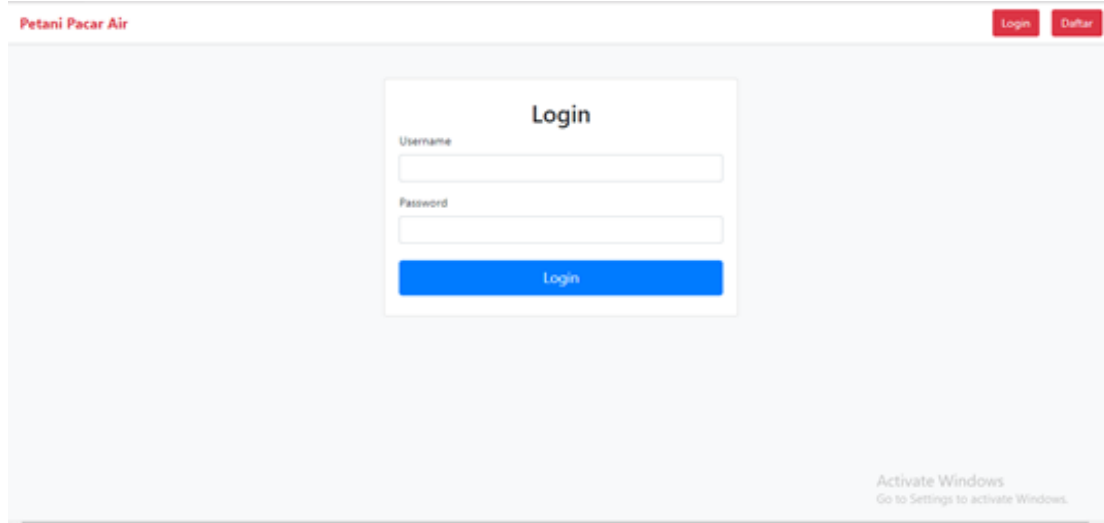


Figure 3. Login Menu For Water Henna Plant Distribution Map.

The data of farmers on the cultivation of water henna plants can change every year, so a data form is needed to *updates* farmer data in accordance with the facts in the field. Changes to the data can only be done by admins who have registered with the website. The admin map of the distribution of water henna farmers in Jombang Regency is given to government agencies for the information needs of the community in Jombang Regency including: Environment Agency, Ministry of Energy and Mineral Resources, Geospital Information Agency and other relevant government agencies. Therefore, the map of the distribution of water henna plants in Jombang Regency can be managed properly and not misused by irresponsible people.

- Provide *Form* to manage the data on the distribution of water henna cultivation farmers in Jombang Regency according to the facts on the ground.

Nama	Usur	Luas Lahan	Marga Jual	Lama Usaha	Lintang	Bujur	akal
Ibu Ani	46 Tahun	225 m2	Rp. 20000	3 Tahun	-7.513940048198151	112.24705252275226	Edit Hapus
Bapak Usman	65 Tahun	22 m2	Rp. 20000	8 Tahun	-7.520260	112.293547	Edit Hapus
Bapak Sutikno	50 Tahun	7000 m2	Rp. 25000	30 Tahun	-7.527963	112.265145	Edit Hapus
Ibu Sukesi	56 Tahun	2800 m2	Rp. 25000	10 Tahun	-7.500869566283868	112.27761309887092	Edit Hapus
Bapak sutaji	63 Tahun	2600 m2	Rp. 25000	10 Tahun	-7.517764	112.268367	Edit Hapus
Bapak Kasan	55 Tahun	900 m2	Rp. 25000	20 Tahun	-7.517919201852052	112.24772130748869	Edit Hapus
Ibu sarah	60 Tahun	700 m2	Rp. 30000	9 Tahun	-7.510466208318576	112.26789003691351	Edit Hapus
Ibu Tuminah	54 Tahun	10 m2	Rp. 30000	20 Tahun	-7.52488841251737	112.27514711247346	Edit Hapus

Figure 4. Form Water Henna Plant Farmer Data.

Data changes can only be made by admins who are already registered in *websitemap* of the distribution of water henna plants in Jombang Regency so that the information provided is truly valid. To add data on farmers cultivating water henna in Jombang Regency by filling out the data form on the page webalready available in accordance with the data that has been obtained include: Name of farmer, age, land area, selling price, length of business, coordinate point, then save. Then automatically the data will be stored to provide the latest information about the distribution of water henna farmers in Jombang Regency.

Previous Research Result

Research with the title "Web-Based Geographic Information System for Rubber Plantation in Merauke Regency," doing research on GIS (*Geographic Information System*) website-based for rubber plantation areas in Merauke Regency. The GIS is used to assist in the publication and promotion of production potential. In addition, GIS is also used to develop rubber plantations by implementing an integrated system with the Google Map Platform. This website-based system can provide information in the form of location, plantation area, production and location of easily accessible rubber plantation land development.

Research with the title "Application of the Waterfall Method in the Design of Industrial Geographic Information Systems in Tegal Regency". Tegal Regency has various industries spread over 18 sub-districts. These industries can support the economy in Tegal Regency. The government of Tegal Regency in collecting industrial data still relies on the census which is carried out manually. The data displayed from the results of the census is still centrally published by the Central Statistics Agency and the information is only in the form of tables without interesting visualizations. The lack of industrial information conveyed to the public, causes the industries in Tegal Regency to be less well known by the wider community, so that the industrial food market in Tegal Regency is not optimal. Besides that, the opportunity to get investors for business development is limited. Geographic information system is a computer system that can record, store, write, analyze and display geographic data. By using the Waterfall method, the design of a geographic information system can provide information about industry profiles, types of production, investment values, industrial maps and industrial locations in every village and sub-district in Tegal Regency (Sasmito, 2017).

CONCLUSION

GIS (*Geographic Information System*) is a system designed to capture, store, manipulate, analyze, organize and display all types of geographic data. GIS (*Geographic Information System*) very helpful in providing information about the distribution of water henna plant cultivation farmers in Jombang Regency by presenting data and information appropriately and accurately based on facts in the field making it easier for the community, especially in the Jombang area to find out the distribution of water henna plants in Jombang Regency. It is known that in the mapping of water henna plant cultivation farmers in Dukuh Klop Village, there are 21 farmers. The data can still be developed again in order to find out information on the distribution of water henna plant cultivation farmers in Jombang Regency as a whole.

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