UTILIZATION OF WORLDVIEW-3 SATELLITE IMAGES FOR 3-DIMENSIONAL (3D) MAPPING AS VISUALIZATION OF TOURISM AREA, KAYU ARO SUB-DISTRICT

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ABSTRACT: One of the efforts to develop and improve the implementation of tourism is through the construction of objects and attractions, either in the form of working on existing tourist objects or creating new objects as tourist attractions. This study aims to map the Tourism Object Area of Kayu Aro District for the tourism sector in the Kayu Aro District, Kerinci Regency, Jambi Province. The method used is descriptive with a quantitative approach. Quantitative research uses image data of description information about tourist objects found in the Tourism Object Area of Kayu Aro District. The final result of this study is a 2-Dimensional Map and 3-Dimensional Visualization of the Tourism Object Area of Kayu Aro District in the tourism sector, Kayu Aro District, Kerinci Regency, Jambi Province.

Keywords—Remote Sensing, World View 3 Satellite Image, 3 Dimensional Map

1. INTRODUCTION

Indonesia is a country that has a lot of natural potentials both on land and at sea, natural diversity, flora, and fauna as well as works of human creation that have a selling value to be developed into a business in the tourism sector. Development in the tourism sector is one of the efforts that need to be carried out by the local government because it provides many advantages or benefits that can be taken, besides that tourism can also contribute to regional income. This is because Indonesia is a tropical country that can promise such beautiful natural beauty that can be utilized for activities in the tourism sector.

Sector development tourism in an area will attract other sectors to develop as well because their products are needed to support the tourism industry. The existence of the tourism industry also has benefits such as increased employment opportunities, community crafts, and so on. Links related to the tourism industry are also able to generate foreign exchange through efforts to develop tourism potential and can also be used as a means to absorb labor to reduce unemployment and increase employment opportunities. One attempt todevelop and improve maintenancetourism through the development of objects and attractions, both in the form of exploiting existing tourist objects and creating new objects as tourist attractions.

Kayu Aro District is part of the Kerinci Regency which is directly adjacent to the northern part of Solok Selatan Regency in West Sumatra Province. The area of Kayu Aro District is 10,606 Ha and has 21 villages and the recorded population in 2020 is 19,754 residents. Kayu Aro District has a variety of tourist destinations, one of which is the Kayu Aro tea plantation, this tea plantation is one of the mainstay tourist destinations in Kerinci Regency where the Kayu Aro tea plantation owned by PTPN 6 is the largest tea garden in the world in one stretch and can offer a direct view of Mount Kerinci. Kayu Aro District is supported by transportation infrastructure in the form of a road that has 2 accesses, namely through the full river city and also through West Sumatra Province, namely through South Solok Regency. In addition, in Kayu Aro District there is an active volcano, namely Mount Kerinci, the mountain which is known to be the highest on the islandof Sumatra with aThe altitude of 3805 Mpl the mountain is a favorite of many tourists, both local and foreign for trekking activities.

Seeing the potential that Kayu Aro District has in various sectors and supported by natural conditions that are still beautiful is very good for tourism development. The existence of tourist object locations in Kayu Aro District is still not widely known by the wider community, although on the internet many websites and Blogspot are found that review information about tourist attractions in Kayu Aro District, but the presentation is still incomplete which has not been accompanied by characteristic features. on the location of tourist objects in detail which can be accessed by the wider community via smartphones.

Three dimensions exist as an artificial form or space from an area of Kayu Aro District so that tourists do not need to bring brochures that only estimate what tours are available in Kayu Aro District. This aims to make it easier for tourists to visit Kayu Aro District so that the information provided can see the real condition of the area, in contrast to a flat

2D map. The advantages of 3-dimensional visuals are that they provide a direct experience, and can show objects clearly, while the weakness is that storage requires a large space (Moedjiono, 1992).

So that the existing potential can be known by the wider community, a 3-dimensional map of the tourism sector can be made which can provide clear information, so that the information obtained is more detailed. Therefore research was conducted for 3D mapping of the Kayu Aro District tourist attraction area by using Wordview imagery for 3 dimensions for visualization of the Kayu Aro District tourist attraction area, as well as by using DEM data (Elevation Model Data) to display the texture of the earth's surface and terrain information on Kayu Aro District. This is useful for tourists to get an idea of what a tourist area in the Kayu Aro District looks like.

2. THE METHOD

The data used are primary data, which is carried out by direct observation of the field, namely around Kayu Aro District. Data processing techniques include image data collection, data processing, and the final stage of map mapping in 3D form. The more complete details are as follows:

1. Pre-Field Stage

a. Data input

This stage is the first step in processing research data. The image data obtained is sourced from Google Earth software which will be processed for mapping a tourist attraction in Kayu Aro District. As well as DEM sourced from BIG (Geospatial Information Agency) which will be processed to form the terrain of the sub-district.

b. Georeferencing

At the Georeferencing stage, the image data aims to determine the real-world coordinates for each pixel in the layer. So that it is easier for researchers to determine the point of the object to be surveyed in the field.

c. Image Cropping

This stage aims to limit the research area so that it is more focused and does not expand the research area, the steps are carried out in the Arcmap 10.3.1 software. This cutting stage is a separation process between images which will be focused on in this study. The cutting process is carried out in the Kayu Aro District area with the aim ofavoiddisturbanceinterpretation of objects that are not needed when classifying images.

2. Field Work Stage

1. Field survey

Surveys field is a research method by taking samples at the point tourist attraction located in Kayu Aro District.

b. Observation

Observations are observations made directly in the field to record all things that are deemed necessary in Kayu Aro District.

3. Post-Field Stage

1. Image Overlay and Field Data

At this stage, it is a process of combining high-resolution image data and DEM according to research boundaries with tourist object point data in the field.

b. 3D Map Making

4. Dimensions (3D) is a model that forms objects or objects so that they look alive. By the object and its basis, this process is automatically whole done on the computer. Through the concept and design process, the whole object can be shown visually 3 dimensions, so many call this result a 3-dimensional modeling (3D Modeling) (Nalwan, 1998). Making maps from 3-dimensional mapping research activities. After conducting field observations, the resulting data
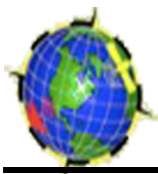
from the field will be input when making the map as information. With Thus the 3D visual map made at this stage is by the actual situation on the ground.

3. RESULTS AND DISCUSSION

1. Utilization of Remote Sensing Data in Mapping the Tourist Object Areas of Kayu Aro District Using High-Resolution Imagery.

Optimizing the utilization of the tourism sector in Kayu Aro District has not been maximized properly, including road access that is still not good enough to support tourist accessibility, as well as the lack of knowledge of outsiders about tourist objects in Kayu Aro District.

Tourist objects in the Kayu Aro District Tourism Object Area located in Kayu Aro District, Kerinci Regency, Jambi Province have quite a large distribution of tourism, so to map the distribution of existing tourist objects, remote sensing data is used by utilizing Worldview high-resolution imagery. 3. Before making the location of the coordinates in the area of the Kayu Aro District tourist object, the researcher processed image data in this area. Tourist distribution point in the Tourism Object Area
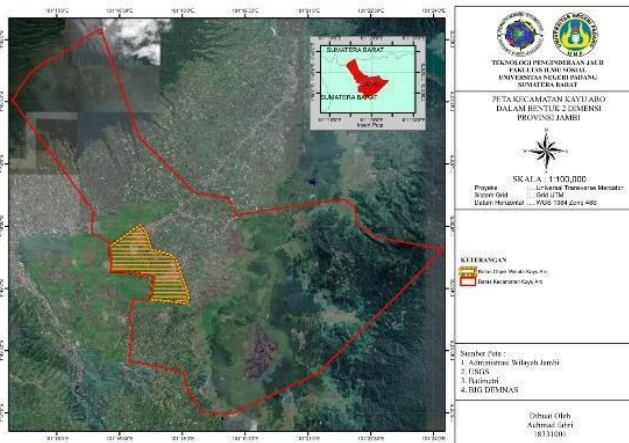
KayuAro District asfollowing:
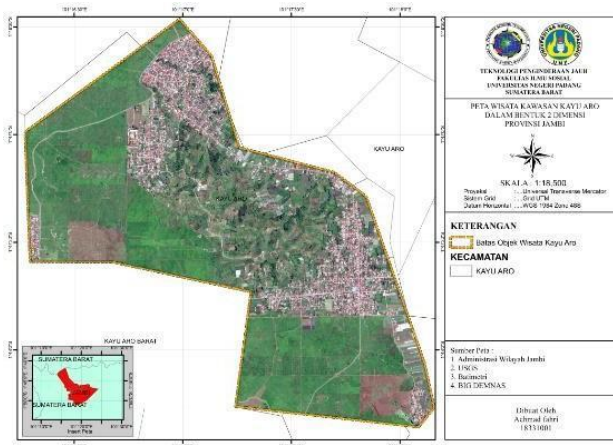

Figure 1. Mapping of Kayu Aro District

Figure 2. Mapping the Tourism Object Area in Kayu Aro District

2. 2D MappingRegionObject

2.1 TourKayu Aro District

2D mapping in the Kayu Aro District Tourism Object Area was carried out on ArcMap 10.3.1 by focusing on tourist objects obtained during field observations and surveys. There are tourist objects in the Kayu Aro subdistrict, such as the tiger monument tourist attraction, the Kayu Aro tea plantation tour, the peak of longing tour, the swarga lodge and homestay tourist attraction, hill of love tours, and tours of Ayia tafsud koto tuo village which can be seen in the picture below:

Figure 3. Mapping Points of Tourist Attractions in the Tourism Object Area of Kayu Aro District

2 .3 Dimensional Mapping of the Kayu Aro District Tourism Object Area

In 3-dimensional mapping in the Kayu Aro District Tourism Object Area using Arcscene software and DEM data. Both of these data are overlaid so that they will form a surface in 3 dimensions. Arcscene aims to adjust the height of a surface on the DEM raster with the Base Hight feature set at a height of 1.5000 so that it gives more visibility to the shape of an earth's surface in the Kayu Aro District Tourism Object Area. View as the use of maps can be seen from anywhere when using 3 dimensions. So that it makes it easier for visitors to see objects in the Kayu Aro District Tourism Object Area easily and freely. The following is a 3D map that has been formed in the object area tourism sector Kayu Aro District Tourism, Kayu Aro District, Kerinci Regency, Jambi Province.

Figure 4. Visualization of 3 Dimensions of the Kayu Aro
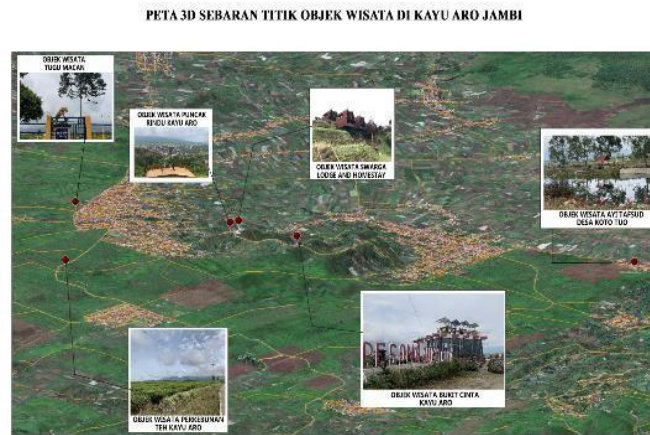
District Tourism Object Area

Figure 5.3D Mapping of Attractions in Kayu Aro District

3. Conclusion

1. UtilizationTechnology Remote sensing can be used to map the distribution of tourist objects in Kayu District Aro. Based on the results of the study, the distribution of tourist objects in the Kayu Aro District Tourism Object Area, namely, tiger monument tourism objects, Kayu Aro tea plantation tourism, Puncak Rindu tourism, Swarga lodge, and homestay tourism objects, Bukit Cinta tourism, and Ayia Tafsud Desa tourism. koto tuo.

2. 3D mapping can be done by overlaying (combining) Worldview-3 high-resolution satellite image data which has a panchromatic band with a resolution of 0.31m as well as a multispectral band with a resolution of 1.24m and a DEM of 8.1m. Data processing using the ArcScene software to adjust the Base Height of the Wordview-3 image which has been synchronized with the DEM image. So thatafter processing will produce a 3-dimensional surface shape for the area of the Kayu Aro District Tourism Object.

4. Suggestion

1. It is hoped that the Kerinci Regency government and the management of the Tourism Object Area in the Kayu DistrictAroto more paying more attention to existing public facilities and paying attention to road access to tourist objects located in the hills. This is because when the researchers surveyed the Kayu Aro District Tourism Object Area to document a tour in this area. Researchers find it a little difficult to access roads to tourist objects located in hilly areas because roadsheading to the tourist attraction is still in soil condition, with lots of rocks and not yet asphalted.

2. To the government of Kerinci Regency and tourism managers in the Kayu Aro District tourist attraction area, they should carry out tourism promotions for outside communities so that the existing tourism potential can be maximized properly and can increase the income of the area and the local community because of the large number of visitors who come to tourist attractions in Kayu Aro District

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