Mapping The Agriculture Land of The Land Farmers in The South Coast of Kulon Progo

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Abstract

The south coast land of Kulon Progo on the beginning was sandy and infertile soil. The land then was converted into agriculture land, chilli farm based on the idea of the agriculture expert, Mr. Karman. This study aimed to map the agriculture land in Bidadara coast, Panjatan district, Kulon Progo because of the the success of the coastal farmers on producing an abundance of chilli harvest. The method used was interviews and field observation. The deviced used for mapping was DJI Mavic 2 Pro multicopter drone operated approximately for 20 minutes. The result of this study was aerial photos of drone shots with a height of 20 meters, 30 meters, and 50 meters above ground level onto the soil conditions adjacent to Bidara Beach, Panjatan, Kulon Progo. It was seen that the stretch of coastal land was planted with coconut trees and chilies. Hence, no wonder that the coastal land farmers are rich because of fantastic income from the farm. It is proven that the cultivation of this chili plant can improve the economy of the farming community on the South Coast of Kulon Progo.

Keywords: Mapping, Chillies, South Coast of Kulon Progo, DJI Mavic

1. Introduction

1.1 The south coastal area of Bidara Beach, Kulon Progo

Majority of the south coastal area of Bidara Beach, Kulon Progo is deployed as the agriculture land and the runway of Yogyakarta International Airport. This area on the beginning had sandy and infertile soil. The land then was converted into agriculture land, chilli and watermelon farms based on the idea of the agriculture expert, Mr. Karman. The coastal area was originally comprised of three districts such as Panjatan, Galur, and Temon. However, most area of Temon district was used as Yogyakarta International Airports. That's why the farm land is concentrated only in two districts left and even these two districts now generate the most chillies in DIY. Mr. Karman stated that the average yield of chili is 1 ton/day in Panjatan District and 20 tons/day in Galur District. Whilst the width of the coastal area that is used as chilli farm is 750 hectares and 350 hectares for the watermelon farm. This coastal land farmer consists of groups, where each of groups is comprised of 100 farmers. The chili cultivation is very profitable as stated by Mr. Karman that farmers' income has reached the highest gain with the price of Rp. 80,000,-/kg (eighty thousand rupiah per kilogram). Thus, the income of the farmer group reaches Rp. 80,000,000, - (eighty million rupiah) per day in one harvest and can have

an income of hundreds of millions of rupiah. This study aims to map agricultural land on the coast of Bidara Beach, Panjatan District, Kulon Progo, due to the success of coastal land farmers who generate an abundant chili yields. The mapping is used to view from an aerial photo of which areas are planted with chilies and watermelons by farmers on the southern coast of Kulon Progo. Chili is the highest income earner for the south coast land farmers in Kulon Progo. At first, they only had very minimal income before the cultivation of chili plants, even they did not own a motorbike and their house was very simple. However, now the economy is growing rapidly even every head of the family has a decent house and car. The follwoing is the figure 1 that shows the research interview with Mr. Karman.

Fig 1. interview with Mr. Karman

2. Mapping The Agriculture Land

Drone as a means of aeromodelling whose name is smartplane is greatly needed in order to maintain food security. It is expected to be able to explore agricultural land with a large area, be able to make aerial photos clear and be resistant to impact (Hasanuddin, I et al., 2022). In supporting the processing of mapping on agricultural land using a web application, the mapping turned out to have a high effectiveness, namely map-based (Balisa, D et al., 2021). The mapping of the rice farm in Ujung Padang, Simalungun utilised the geographic information system based on website that has been accompanied by the coordinates and the route to the location (Samosir, M. H et al., 2022). Mapping the area of rice farm in Banyumas Regency at an altitude of 25-250m above sea level with an area of 12,000 Ha for mapping security and controlling land functions (Ahadiyat, Y. R et al., 2021). The Geographical Information System in Panggungharjo village, Sewon, Bantul produced data that agriculture land was decreased by 1,96%/year (Salsabila, S., 2022). The antonomous drone mapping aimed for land mapping of 64,5 m^2 width (Rofi'i, A et al., 2021). Lubuk Kertang mapping the potential of the village as an effort to succeed the concept of tourist village (Harahap, M et al., 2021). Satelite image analysis in Kuta Utara District generated mapping of the rice farm with a variety of color elements from light to light green (Oktafianti, K. D et al., 2021). Thematic Community Services (KKN Tematik)Activities of Puangrimaggalatung University used sprayer drone to map the agriculture land and agriculture inovation (Hasmi, H et al., 2022). Research utilised drone to predict rice harvest using the data of rice that started to yellow (Pratama, R. A., 2022). Research using hexacopter generated the difference calculation of the drone position distance by an accuracy of 0.899651 metre with the flight test in field (Panjaitan, D.S., 2022). Research using DJI Phantom drone generated data on the flood and erosion area in Somangari, Purworejo, Jawa Tengah (Suroso, I., & Prasetiyo, E. E., 2021). Research result using multicopter drone in the Sermo Reservoir area, Kulon Progo stated that the debit of the reservoir water was reduced by 4 meters due to the dry season and the debit rate was reduced by 800 liters/second (Suroso, I., 2021). The advantages of multicopter drone are constant to the speed of wind (Suroso, I., & Pratama, H. H., 2020). The drone Mapping in Lampung using fixed wing drone generated the excellent aerial photo (Suroso, I., & Irmawan, E., 2018). The result of the study in the south coast of Temon beach, Kulon Progo (source of ironsand) turned out that the aerial photo was printed afterward generated barren land so that it does not suit for farming (Suroso, I., 2020). This study using red filter and super blue with the camera modification, evidently had an accuracy of 84.7887% in the wetland (Soesanto, O et al., 2022). Drone could be used to spray plants in order to free from armyworm attacks (Nasution, A. Y., & Muhammad, A., 2021). DJI Phantom drone could be used to map agriculture land, plantations, settlements, and fish ponds (Hakim, M. A et al., 2021). Drone is also able to map forest fire around the University of Palangkaraya (Perkasa, P et al., 2022). Sand land mapping Batam with drone (Roziqin A et al., 2020).

3. Drone

Drone for mapping in this research, it can be seen on the Figure 2.

Spesification

Dimension (Pxl)	:	322 x 242 mm
Arm Span	:	354 mm
Total Weight	:	907 gram
Max Hovering Time	:	29 minutes
Max Flight Time	:	15 minutes
Max Distance	:	15 km
Propeller	:	8743 Low-Noise
Motor	:	WM240-2009, 14.8 V, max 1040 rpm/V
Battery Type	:	LiPo
Battery Voltase	:	15.4 VDC, 4 cell
Remote Control	:	2.4 GHz
Video Transmission	:	5.8 GHz
Camera Stabilizer	:	3 axis (tilt, roll, pan)
Sensor	:	1" CMOS, 20MP
Lens	:	35 mm
Aperture	:	f/2.8 – f/11
ISO Range	:	100-12800

Fig 2. Drone for mapping

4. Method

a. Location : The south coast of Bidara beach, Panjatan, Kulon Progo
b. Instrument : Drone DJI Mavic 2 Pro
c. Method :
   1) Preparing to synchronize remote control with drone.
   2) Preparing to calibrate drone.
   3) Preparing to set drone release with remote control.
   4) Setting the height of Aerial photography and camera to get the right picture.
   5) Aerial photography with camera.
   6) Landing drone carefully ti avoid the crash just like as it is seen on figure 3.

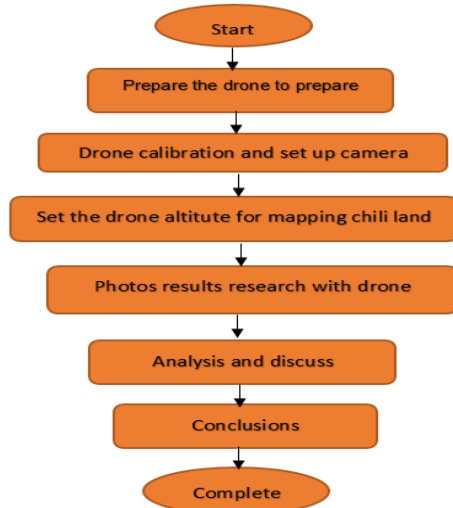**Fig 3.** Landing drone

7) Flowchart, it can be seen ini Figure 4.

Fig 4. Flowchart

5. Results and Discussion

5.1 Aerial Photos From Drone Shots With A Height Of 30 Meters Above The Ground

The result of the research was aerial photos from drone shots with a height of 30 meters above the ground onto the soil conditions adjacent to Bidara Beach, Panjatan, Kulon Progo as shown in Figure 5. The yield of this chili farm is about 1 ton / day if the dry season continues with good weather. On the other hand, during the rainy season and the sunlight expossure is not found, the chili is preserved and put into the hut of a solar panel so that the decay can be avoided and the durability can be maintained. Eventually, the yield can be sold outside. This research is on an area of 5000 meters where chili trees grow, the purpose of research in this area is to find out the mapping images of chili farming land by coastal land farmers.

Fig 5. Mapping the coastal land of chilli farm in Panjatan, Kulon Progo with a height of 30 metres above ground level

5.2 Aerial Photos From Drone Shots With A Height Of 20 Meters Above The Ground

Then, this coastal land photographed from a height of 20 meters belongs to Mr. Karman's group. This land is very fertile as he fertilizes it every 10 days using Gandasil D for leaves and Gandasil B for fruit. Apart from fertilizing, insecticides and fungicides are sprayed interchangeably to produce good and quality chili. The harvest process needs approximately 65 days of plantation and will be harvested every 5 days afterward. The following is an aerial photo of chili farm taken from a height of 20 meters above ground level as shown in Figure 6. This research is on an area of 5000 meters where chili trees grow.

Fig 6. Mapping the coastal land of chilli farm in Panjatan, Kulon Progo with a height of 20 metres above ground level

5.3 Aerial Photos From Drone Shots With A Height Of 50 Meters Above The Ground

The following figure 7 also shows a chili farm on the south coast of Kulon progo with an area of about 30 hectares managed by farmer groups led by Mr. Karman and the Bidara Beach that stretches broadlly in the Panjatan area, Kulon Progo. As it is seen in figure 6, the stretch of the coastal land is planted with coconut and chili. No wonder that the farmers there are rich since they earn fantastic income from the sale of these agricultural products. It is proven that the cultivation of this chili plant can improve the economy of the farming community on the South Coast of Kulon Progo.

Fig 7. Mapping the coastal land of chilli farm in Panjatan, Kulon Progo with a height of 50 meters above ground level, the bidara beach is seen

6.1 Conclusions

The results of mapping with drone is the south coast area of the Bidara Beach, Kulon Progo is mostly used for agricultural land, one of which is in the Panjatan area, Kulon Progo, area of 30 hectare for chilli plants. The result of this study was aerial photos of drone shots with a height of 20 meters, 30 meters, and 50 meters above ground level onto the soil conditions adjacent to Bidara Beach, Panjatan, Kulon Progo. Chili farmers grow chilies along the coast of Bidara Beach and generate high income.

Acknowledgements

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