

EVALUATION OF LAND SUITABILITY FOR OIL PALM PLANTATIONS IN GUNUNG TULEH DISTRICT

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ABSTRACT: The purpose of this study was to determine the suitability of oil palm plants in the Gunung Tuleh sub-district and overlay mapping of the suitability level of oil palm plants. The technique used is scoring analysis to provide an assessment of each land unit, the data used is secondary data processed from soil type map data, rainfall maps, slope maps, elevation maps, land use maps, geomorphological maps and river distance maps. Based on the results of map overlays or a combination of several land suitability maps in Tuleh Mountain, it is classified into 4 classifications namely; 1) not suitable (S1) has an area around 23547.02 ha; 2) very suitable (S2) has an area of 10462.06 ha; 3) quite suitable (S3) has an area of 5245.81 ha; 4) According to the marginal area, it has an area of 9915.20 ha. So planting oil palm in Gunung Tuleh is not all areas that can be planted with oil palm because it has to consider the assessment of the valuation of a land so that the results of oil palm fruit production are maximized.

Keywords: *Land Suitability, Oil Palm Plantation*

1. INTRODUCTION

Gunung Tuleh District is a sub-district in West Pasaman Regency, West Sumatra, Indonesia. This district has thousands of cities in Simpang Tiga Alin. In this sub-district there are Seven Nagari. The seven Nagari are: Bahoras, Muaro Kiawai, Muaro Kiawai Barat, Muaro Kiawai Hilir, Rabi Jonggor, Ranah Sungai Magelang and Litter of Ascension.

Based on its geographical position, Gunung Tuleh District has territorial boundaries, that is, to the north it is bordered by North Sumatra Province, to the south by Pasaman District, to the west by Lembah Melintang District, to the east by Talamau District and Pasaman Regency. Gunung Tuleh District has an area of 453.97 km². Gunung Tuleh District is located 26-1,875 meters above sea level, crossed by 14 rivers.

plantations in Indonesia such as oil palm, rubber, coconut, coffee, cocoa, tea, spices and others are superior commodities and are still aimed at achieving the export value target of up to 1,400 trillion in 2024, the country's foreign exchange from plantation exports has only reached 400-500 trillion per year. oil palm plantations are very much liked by the people in Gunung Tuleh because the market price is quite stable. oil palm plantations also have maintenance which is said to

be relatively easy compared to other plantations and has a long term, oil palm plantations can last up to 20 years as long as they are cared for properly and maintained, the people of Gunung Tuleh have a lot of oil palm plantations where the palm oil mills are very close to the area. Plantation plantations really need the requirements of a land to get the requirements of a particular land, each plant has requirements with criteria whereby the plant can produce optimally and produce good fruit. Land suitability is the level of suitability of a plot of land for a particular use [1]. A success in farming is largely determined by a good planting medium for these plants.

[2] land suitability evaluation is an assessment of the suitability of land types for specific land use types. The purpose of land evaluation itself is to predict and plan for all the consequences and impacts that may occur in land use. By evaluating the land. Then planning in land use will see how suitable the oil palm plants are on Gunung Tuleh, it is hoped that it will obtain land characteristic data that can show the characteristics of the land so that the level of suitability of the land can be known, especially for oil palm plants. Then the efforts contained in the characteristic data will be carried out to optimize crop production.

2. METHODS

The method used is map overlay analysis and scoring. a. Overlay The Overlay method is an information system in graphical form which is formed by merging various individual maps (having specific information/database). Map overlay is done with at least 2 different types of maps, technically speaking, it must be custom polygons that are formed from 2 types of maps that are overlaid. b. Scoring analysis To determine land suitability class based on physical conditions, scoring analysis is used with the variables in the form of Slope Slope, Soil Type, Rainfall, Topography, Land Use

2.2 Land Evaluation

Land evaluation according to FAO 1976 is the process of assessing the appearance of land for a specific purpose, including the implementation and interpretation of surveys and studies of land forms, soils, vegetation, climate and other land aspects, in order to identify and make comparisons of various land uses that might be developed.

However, land evaluation has traditionally been 'pedocentric', ie emphasizing soil resources and being carried over by soil scientists [3]

Land suitability is the level of suitability of a piece of land for a particular use. Land suitability

is obtained from an objective assessment of land criteria. The reference for land suitability assessment is the use of known land suitability classification criteria, both general and specific. The results of the assessment are in the form of land suitability classes and subclasses of the assessed plants determined by the heaviest limiting factor. These limiting factors may consist of one or more depending on the characteristics of the land [4]. The land suitability class is principally determined by matching the land quality/characteristic data from each map unit with the land suitability class criteria for each evaluated commodity.

3. RESULTS AND DISCUSSION

3.1 Research sites

Gunung Tuleh is a sub-district in West Pasaman Regency, West Sumatra, Indonesia. This district has thousands of cities in Simpang Tiga Alin. In this sub-district there are Seven Nagari. The seven Nagari are: Bahoras, Muaro Kiawai, Muaro Kiawai Barat, Muaro Kiawai Hilir, Rabi Jonggor, Ranah Sungai Magelang and Litter of Ascension.

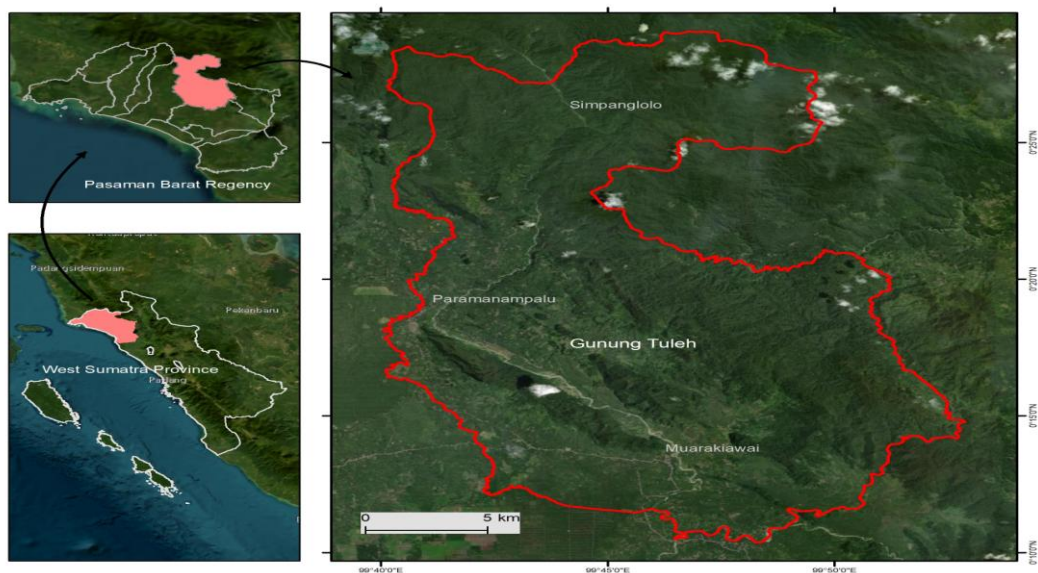


Fig 1. Research sites

3.2 Soil type and annual rainfall

[5] soil is the layer of the earth's surface originating from parent material that has undergone further processing, due to natural

changes under the influence of water, air, and various organisms, both living and those that have dead.

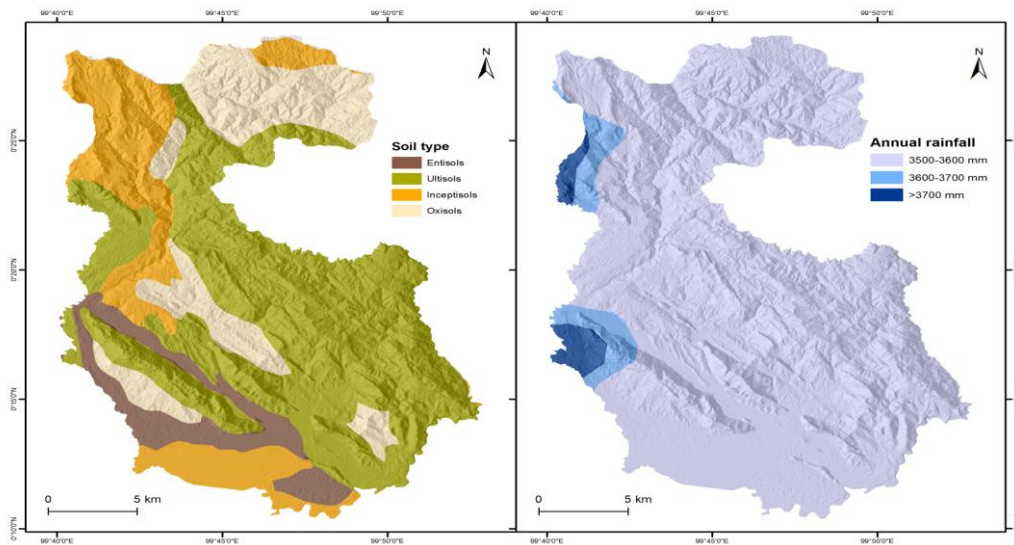


Fig 2. Map of Soil Type and Rainfall

Based on the soil type map above, land unit 1 has entisol soil type. Entisol soil is found mostly in the soil atmosphere layer or in areas where erosion occurs. The color of the entisol soil is brown to gray. Land unit 2 has inceptisols soil type where the soil is young and begins to develop. The profile has a horizon that forms rather slowly as a result of alteration of the parent material. The horizons do not show the results of intensive weathering. Horizons of clay accumulation and obvious iron & aluminum oxides are absent in these soils.

The 3 land units are young and starting to develop. The profile has a horizon that forms rather slowly as a result of alteration of the parent material. The horizons do not show the results of intensive weathering. The clay accumulation horizon and iron & aluminum oxides are clearly absent in this soil. Land unit 3 has a soil type of oxisols which is a soil that has low nutrient properties, very low fertility, high exchangeable Al

content and iron oxidation. Land unit 4 has ultisols soil type where Ultisols are soils that are poor in nutrients, especially organic matter content. Generally, the organic matter content in this soil is very thin in the topsoil. [6] that Ultisol soils generally have low organic matter content (<1%. Whereas the rainfall on Mount Tuleh has 3 land units where rainfall is 3500-3600 mm, land unit 2 has rainfall 3600-3700 and land unit 3 has more than 3700 mm.

33. Elevation and Slope

Elevation is the position of the height of an object from a certain point (datum). The datum used usually refers to sea level or the surface of the WGS-84 geoid used in the GPS (Global Positioning System). Therefore, it is not surprising that many say elevation is the sea level area (asl) while Slope Slope is a land surface that is sloping and forms a certain angle to a horizontal plane and is not protected [7].

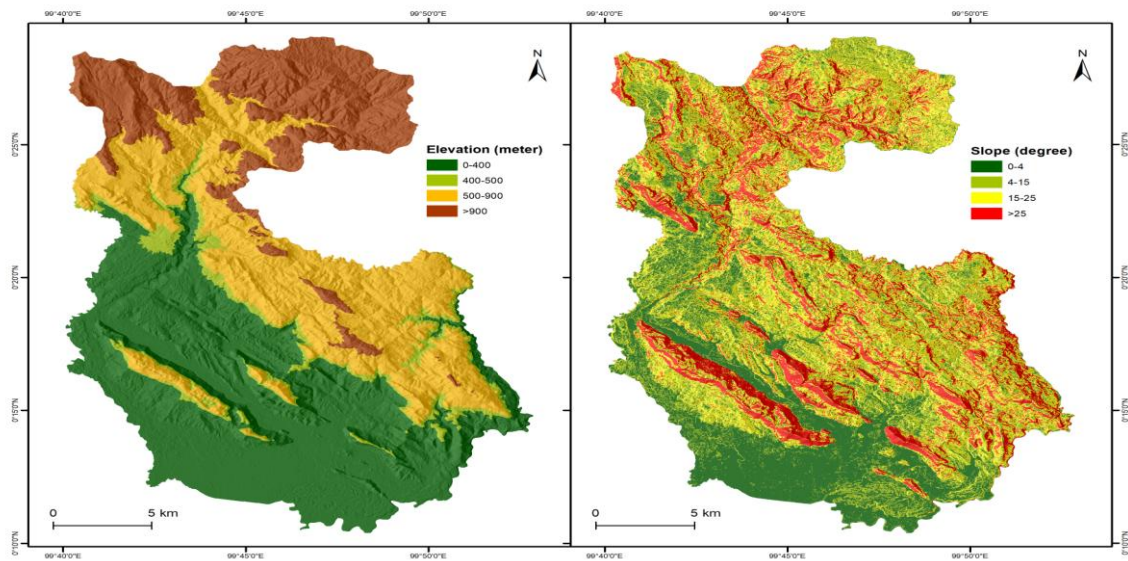


Fig 3. Elevation and Slope Map

Based on the elevation map above, there are 4 land units that have different characteristics, land unit 1 has 0-400 meters above sea level, land unit 2 has a height of 400-500 meters above sea level, land unit 3 has a height of around 500-900 meters above sea level, and land unit 4 has a higher altitude. from 900 masl. Meanwhile, the slope on the map above for land unit 1 has a slope of around 0-4%, land unit 2 has a slope of around 4-15%, land unit 3 has a slope of around 15-25% and the last has a slope of more than 25%.

3.4.Land cover and Distance from river

Land cover is the physical surface of land [8] while land use is an expression of the interaction between the environment and human activities that try to make the environment suitable for life and their needs [9]. A river is a channel where water flows with a free water surface. At all points along the channel, the pressure on the water surface is the same, which is usually atmospheric pressure. Flow variables are highly irregular with respect to space and time.

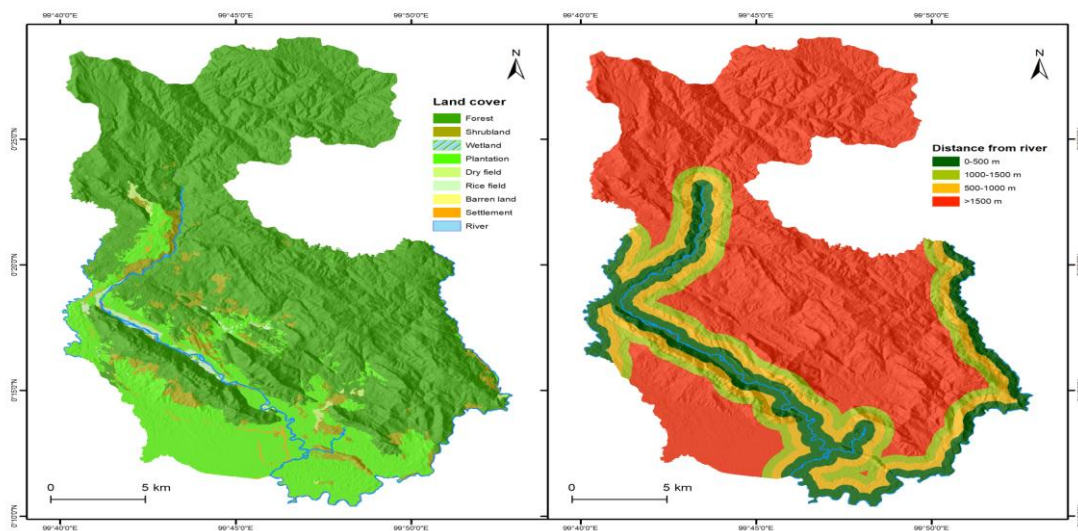


Fig 4. Land Cover and River Distance Map

Based on the land cover map it has 11 objects, the first is the lake has an area of about 0.2 ha, 2. jungle has an area of about 37878.2 ha, 3. river

sand has an area of 108.3 ha, 4. settlements have an area of about 182.8 ha, 5. swamps have an area of about 3.3 ha, 6. rice fields

have an area of about 328.0 ha, 8. shrubs have an area of 2271, 2 ha. 9. rivers have an area of 352.9 ha, 10. vacant land has an area of about 2 ha, 11. fields have an area of about 233.6 ha. While the river distance is classified into 4 objects, the first land unit has a distance from the river of about 0-500 m, 2. has a distance of about 500-1000 m, 3. has a distance of about 1000-1500 m and the last has a distance of more than 1500 m .

3.5. Gemorphology

Geomorphology is the study of landforms and the processes that influence them and investigates the interrelationships between landforms and these processes in spatial arrangements [10].

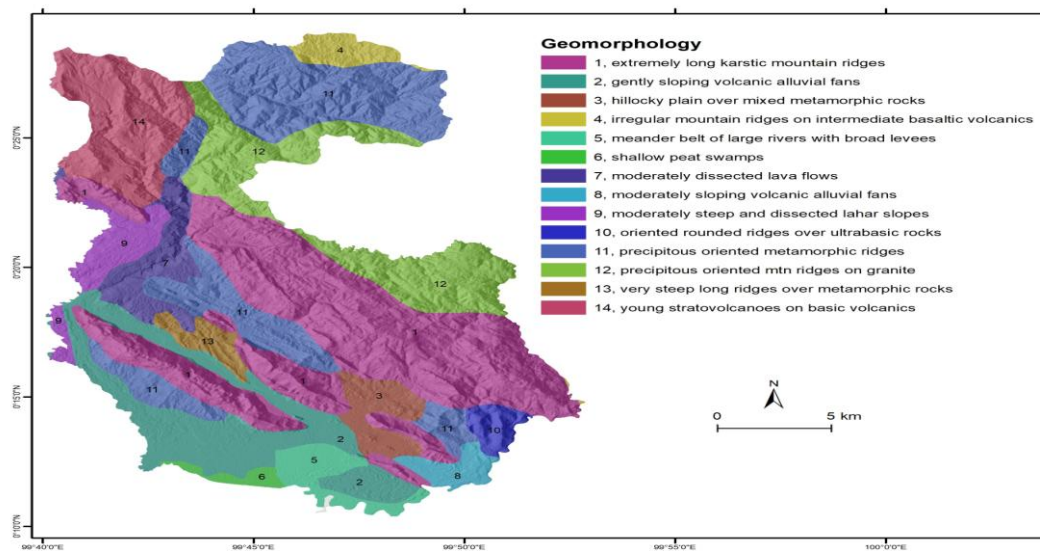


Fig 5. Geomorphological map

Based on the geomorphological map of the Gunung Tuleh sub-district, the geomorphological conditions are classified into 14 objects. The 1st is very long karst mountains 2. A gently sloping volcanic alluvial fan 3. Hilly plains above mixed metamorphic rocks 4 Irregular mountains in medium basaltic volcanic 5. Belts large meandering river with wide embankments 6. moderately dissected lava flows 7. moderately gentle volcanic alluvial fans 8. moderately steep and dissecting lava slopes 9. oriented rounded

ridges over ultramafic rock 10. steeply oriented metamorphic ridges 11. steeply oriented mtn ridge on granite 12. long very steep ridge over metamorphic rock 13. young stratovolcano on base volcano 14. shallow peat swamp.

3.6. suitability of oil palm land

Land suitability is the level of suitability of a plot of land for a particular use [11]. An agricultural business, the conditions for its success are largely determined by the suitability of the land that becomes the planting medium.

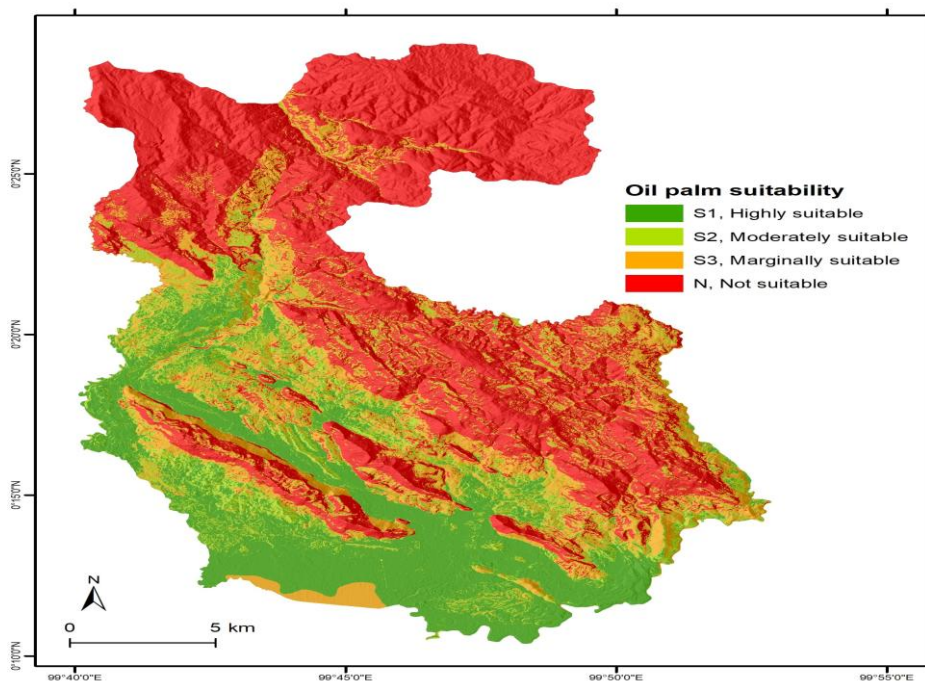


Fig 6. Oil Palm Land Suitability Map

Based on the land suitability map for oil palm plantations above, the results of overlaying or combining several maps can be classified into 4 land use objects with the classification 1. not suitable (S1), 2. very suitable (S2), 3. quite suitable (S3), 4. suitable marginal (S3). land unit 1 for planting oil palm is not suitable (S1) with an area of 23,547.02 ha not suitable for planting oil palm land unit 2 is very suitable (S2) for planting oil palm with an area of 10,462.06 ha very suitable planted with oil palm, land unit 3 is quite suitable (S3) with an area of 5245.81 ha quite suitable for planting oil palm, 4 land units are suitable for marginal oil palm plantations. From the 4 different assessment classifications not all areas of Gunung Tuleh are suitable for planting oil palm.

4. CONCLUSION

The suitability of oil palm land in Gunung Tuleh can be concluded that not all areas of Gunung Tuleh are suitable for planting oil palm, as some areas do not meet the criteria for oil palm suitability level of oil palm plants. The technique used is scoring analysis to provide an assessment of each land unit, the data used is secondary data processed from soil type maps, rainfall maps, slope maps, elevation maps, land use maps, geomorphological maps and maps distance of the river. based on the results of map overlays or a combination of several land suitability maps on Mount Tuleh it is classified into 4 classifications namely; 1) not suitable (S1) has an area of around 23547.02 ha; 2) very suitable (S2) has an area of

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