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EVALUATION OF LAND SUITABILITY FOR OIL PALM (ELAEIS QUINEENSIS JACQ) IN TANJUNG SIRAM VILLAGE BILAH HULU DISTRICT LABUHANBATU

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Abstract

Currently, the government continues to encourage the development of oil palm plantation areas with the aim of boosting domestic economic activity. Tanjung Siram has a large area of land and has the potential to be developed into plantations, especially oil palm plantations. This regency has a land area of 1056 ha. Therefore, an evaluation of land suitability needs to be carried out in order to know the actual and potential land suitability class recommendations for oil palm plantations in that village. The stages in the research included secondary data collection, pre-survey, main survey and soil analysis in the laboratory. Land suitability classification is done by matching method. From the research results it is known that the limiting factors in the actual land suitability class at the study site were temperature, water availability, nutrient retention, and erosion hazard. After improvements have been made with good land management, the land suitability class can be increased with a potential land suitability class, which was previously classified as S3, increased to S2, and previously classified as S2, can be increased to S1. Thus, to obtain good oil palm growth in this region, it is necessary to improve the limiting factors on each land.

Keywords: ***Erosion hazard, nutrient resistance, land unit, survey and potential.***

INTRODUCTION

One of the plantation commodities that has high potential in the national economy is palm oil, this is a source of state revenue, regional development, both agro-industry, and providing employment and becoming one of the mainstays of non-oil and gas foreign exchange sources for Indonesia. The area of palm oil plantations in Indonesia in 2018 was 3.06 percent to 12.76 million ha (Central Statistics Agency, 2018).

The productivity of oil palm plantations in West Sumatra in 2020 was at 2.58 tons/ha. Labuhanbatu Regency is one of the areas that has a plantation sector in West Sumatra. In 2020, the area of oil palm plantations in Labuhanbatu Regency was 32,595 ha with a productivity of 3,220 tons/ha. In Bilah Hulu District, the area of oil palm plantations was 1,036 ha with a productivity of 4,687 tons/ha, still below the national plantation productivity figure of 3,250 tons/ha (Central Statistics Agency of North Sumatra Province, 2021). Based on this, it is estimated that oil palm cultivation in Kenagarian Tanjung Siram, Bilah Hulu District, Labuhanbatu Regency has not been carried out based on land suitability classes. Therefore, it is necessary to conduct research to evaluate the suitability of oil palm land, considering that this area has quite a large area and has the potential as a location for oil palm plantations.

Evaluation of oil palm land suitability is an effort to determine the potential of land resources for the use of the land. Land evaluation activities begin with conducting surveys, land observations, sampling and soil analysis in the laboratory. Based on the data obtained, it is compared with the requirements needed to support oil palm growth. Thus, recommendations for actual and potential land suitability for the use of the land are obtained.

MATERIALS AND METHODS

The research was conducted in Tanjung Siram, Bilah Hulu District, Labuhanbatu Regency and soil analysis was conducted in the Laboratory of the Faculty of Science and Technology, Labuhanbatu University. This research was conducted from July to October 2024. The materials needed in this study are soil samples from Tanjung Siram, Bilah Hulu District, Labuhanbatu Regency, 25x40 cm plastic bags for the containers of soil samples taken, rubber bands to tie the plastic soil samples, label paper to label each soil sample and stationery. The tools used in the field in this study were a Belgian drill to take soil samples with a drill bit length of 20 cm and an overall length of 120 cm, a Global Positioning System (GPS) to determine the coordinate points and altitude of the place, Avenza maps to determine sample points in the field, a Munsell Soil color chart book to determine soil color and a machete.

In this study, the method used is the survey method. Soil sampling was carried out using the purposive sampling method on each land unit with a scale of 1: 50,000. Evaluation of land suitability for robusta coffee plants in Tanjung Siram, Bilah Hulu District, Labuhanbatu Regency by classifying with the matching method using semi-detailed accuracy which generally leads to the Technical Guidelines for Land Evaluation for Agricultural Commodities, Revised Edition 2011, which is distinguished according to its level, namely: order, class, subclass and unit (Djaenudin et al., 2011). Based on the analysis conducted in the laboratory, data was obtained on the characteristics of land for oil palm plants in Tanjung Siram which was presented simply in the form of a table which was then compared with the growing requirements for oil palm plants as can be seen in Table 1.

Table 1. Classification of Land Suitability for Oil Palm Plants

land characteristics	S1	S2	S3	N
Ttemperature (tc)				
Ttemperature setting (°C)	22-25	-	19-22	< 19
		25-28	28-32	> 32
Water availability (wa)				
Rainfall (mm)	2,000-3,000	1,750-2,000	1,500-1,750	< 1,500
		3,000-3,500	3,500-4,000	> 4,000
Length of dry period (months)	2-3	3-5	5-6	> 6
Humidity (%)	45-80	80-90;35-45	< 90;30-35	< 30
Oxygen availability (oa)				
Drainage	Good	Currently	A bit hampered-bat,quite fast	Tobstructed, very ter-slow, fast
Rooting media (re)				
Ttexture	Smooth, somewhat fine, medium	-	A bit rough	Very smooth, rough
Crude material (%)	< 15	15-35	35-60	> 60
Soil depth (cm)	> 100	75-100	50-75	< 50
Nutrient retention (nr)				
CEC See (cmol)	> 16	≤ 16	-	-
Base saturation (%)	> 20	≤ 20	-	-
pH H_2O	5.0-6.5	4.2-5.0	< 4.2	-
		6.5-7.0	> 7.0	-
C-organic	> 0.8	≤ 0.8	-	-
Danger of erosion (eh)				
Slope (%)	< 8	8-16	16-30	> 30
Danger of erosion	Very low	Low-medium	Heavy	Very heavy
Flood hazard (fh)				
Puddle	F0	F1	F2	> F2

Land preparation (lp)				
Surface rocks (%)	< 5	5-15	15-40	> 40
Rock exposure (%)	< 5	5-15	15-25	> 25

Source: (Djaenudin, et al., 2011)

RESULTS AND DISCUSSION

A. Land Unit

To determine land sauna, a common approach is to select properties that can be seen and measured to facilitate determining the boundaries of land units in the field presented in the form of maps. Land units in this study were obtained from overlaying administrative maps, land use maps, soil type maps, and slope class maps. Based on the overlay results on the four types of maps, in the Lubuk Karak Nagari area, 11 Land Units (SL) were obtained as a reference for soil sampling. The land unit map can be seen in Table 5.

Based on Table 5, it is obtained that the land units in Tanjung Siram are Land Unit 1 has an area of 276.97 ha, has a soil order of Inceptisols with sub-order Dystropepts, a flat slope category and land use in the form of forest plants, Land Unit 2 has an area of 484.42 Ha, has a soil order of Inceptisols with sub-order Dystropepts, a rather steep slope category and land use in the form of forest plants. Land unit 3 has a land area of 60.81 Ha, has a soil order of Inceptisols with sub-order Eutropepts, a rather steep slope category and land use in the form of forest plants. Land unit 4 has a land area of 53.08 Ha, has a soil order of Inceptisols with sub-order Dystropepts, a rather steep slope category and land use in the form of Plantation/Gardening plants. Land unit 5 has a land area of 38.32 Ha, has an Ultisol soil order with a Hupludults sub-order, a fairly steep slope category and land use in the form of plantation/garden crops.

Land unit 6 has a land area of 484.99 Ha, has a soil order of Inceptisols with sub-order Dystropepts, a rather steep slope category and land use in the form of forest plants. Land unit 7 has a land area of 2495.47 Ha, has a soil order of Ultisol with sub-order Hupludults, a rather steep slope category and land use in the form of forest plants. Land unit 8 has a land area of 14.91 Ha, has a soil order of Inceptisols with sub-order Eutropepts, a gentle slope category and land use in the form of dry fields/fields. Land unit 9 has a land area of 2287.24 Ha, has a soil order of Inceptisols with sub-order Dystropepts, a gentle slope category and land use in the form of forest plants. Land unit 10 has a land area of

103.55 Ha, has Inceptisols soil order with Eutropepts sub-order, gentle slope category and land use in the form of forest plants. Land unit 11 has a land area of 403.17 Ha, has Ultisol soil order with Hapludults sub-order, gentle slope category and land use in the form of forest plants.

1. Land use

Land use is an important part in determining the type of land use to be evaluated. Land use in the research area is very diverse, this is influenced by natural factors and various land use activity factors. In general, land use in the research area is dominated by forest plants, the rest of the land use is used for settlements and plantations. Where in land unit 1,

2, 3 there is land use with the type of forest, land units 4, 5 there is land use with the type of plantation/crop, land units 6, 7 there is land use with the type of forest, in land unit 8 there is land use with the type of dry field/field, and in land units 9, 10,

11 there is land use with forest type.

2. Soil Type

At the research location based on the soil type map in Tanjung Siram with a scale of 1:50,000, there are 2 soil orders, namely Inceptisol and Ultisol. The Inceptisol soil order with the Dystropepts sub-order. Dystropepts is an association of Andosol type soil. Andosol is soil that generally contains high organic matter formed from tuff and intermediate volcanic ash, found mainly in hilly and mountainous areas with relatively high elevations. This type of soil easily absorbs water and has high permeability (BPDAS 2009). This is in accordance with the conditions in land unit 1 which is

the surrounding hills, as well as land unit 2, although predominantly plains, there are also several hills around it.

3. Slope

Based on the slope class map, Tanjung Siram has four slope criteria. The flat slope criteria are criteria with a slope class of 0-8% found in land unit 1. The gentle slope criteria have a slope class of 8-11% found in units 8, 9, 10, and 11. The steep slope criteria are found in land units 2 and 3 with a slope class of 15-25%. And the very steep slope criteria have a slope class of 25-40% found in land units 4, 5, 6,7.

Table 2. Land Unit (SL) Results Tanjung Siram District Bilah Hulu Regency Labuhanbatu

Land Unit (SL)	Area (Ha)	Percentage	Land Use	Land Order	Slope (%)	Coordinate Points
1	276.97	5.13	Forest	Inceptisols	0%-8%	101◦14'2.003"E' 0◦57'21.434"S
2	484.42	8.22	Forest	Inceptisols	15%-25%	101◦14'34.886"E' 0◦56'15.377"S
3	60.81	1.90	Forest	Inceptisols	15%-25%	101◦14'36.078"E' 0◦56'58.550"S
4	53.08	0.79	Plantation/Gardening	Inceptisols	25%-40%	101◦14'31.428"E' 0◦57'27.070"S
5	38.32	1.57	Plantation/Gardening	Ultisol	25%-40%	101◦14'31.428"E' 0◦59'34.759"S
6	484.99	7.23	Forest	Inceptisols	25%-40%	101◦13'52.604"E' 0◦59'2.837"S
7	2495.47	37.22	Forest	Ultisol	25%-40%	101◦12'57.387"E' 0◦59'45.112"S
8	14.91	1.22	Fields/ Fields	Inceptisols	8%-11%	101◦12'40.132"E' 0◦59'32.170"S
9	2287.24	34.12	Forest	Inceptisols	8%-11%	101◦12'24.602"E' 0◦59'22.680"S
10	103.55	1.54	Forest	Inceptisols	8%-11%	101◦14'21.239"E' 0◦59'333.525"S
11	403.17	6.01	Forest	Ultisol	8%-11%	101◦14'8.134"E' 0◦57'52.090"S
Total	6702.98	100				

B. Land Characteristics to be Considered

1. Climate

Oil palm is a plantation crop that is tolerant to environmental conditions. gan which is not good, but to achieve optimal growth levels requires a certain range of environmental conditions. Climate conditions are one of the main environmental factors that affect the success of oil palm development. Based on the data that has been obtained, the average temperature in Tanjung Siram ranges from 25°C which is included in class S1 (very suitable).

1. Physical Properties of Soil

Soil physical properties are one of the important factors to support the growth of oil palm plants. Part of the soil physical properties that need to be considered is soil texture. The results of soil texture analysis can be seen in Table 3.

Table 3. Results of Soil Texture Analysis in Tanjung Siram

Unit Land (SL)	Faction			Texture Class	Criteria (*)
	Sand (%)	Dust (%)	See (%)		
1	0.75	16.07	83.18	Look	Fine
2	8.03	45.91	46.05	Look Dusty	Fine
3	11.13	42.83	46.04	Look Dusty	Fine
4	2.67	54.66	42.67	Look Dusty	Fine
5	3.05	46.93	50.01	Look Dusty	Fine
6	1.96	48.95	49.09	Look Dusty	Fine
7	8.30	42.72	48.98	Look Dusty	Fine

8	3.18	59.71	37.11	Clay Loam Dusty	A bit subtle
9	8.16	53.24	38.60	Clay Loam Dusty	A bit subtle
10	5.32	29.54	65.14	Look	Fine
11	6.16	50.18	43.66	Look Dusty	Fine

From the data obtained from laboratory analysis as in table 3, In the research area, the dusty clay texture class is more dominant in the area, where it is found in SL 1, SL 2, SL 3, SL 4, SL 5, SL 6, SL 7, SL 11 with fine class criteria, in SL 8, SL 9 it has a dusty clay loam texture with rather fine criteria, while in SL 10 it has a clay texture with fine criteria. Tsoil texture is very important to know before planting on the land we want. This is related to the ability of the soil itself to absorb various things such as the ability to absorb water, nutrients, and also the ability to make the soil stable in any condition. According to Sutanto, (2005) soil texture is related to moisture, soil air and soil nutrients. This will certainly affect the growth and development of a plant.

3. Chemical Properties of Soil

a. pH H2O

The pH value of the soil in Tanjung Siram ranges from 4.4 to 4.9 with acid criteria. After matching with the criteria for land suitability for oil palm plants according to Djaenudin et al., (2011), it is known that the land suitability is S2 (Quite Suitable). Increasing the pH value of the soil can be done by adding lime and organic materials.

b. C-Organic

Based on the results of laboratory analysis, C-Organic was obtained at the research location with low-high and very high criteria.

low. Very low organic matter content was found in SL 9, namely 0.70%, while the highest organic matter content was found in SL 3, namely

3.90%. After being matched with the land suitability criteria for oil palm plants according to Djaenudin et al., (2011), the land suitability is classified as S1 and S2.

c. Cation Exchange Capacity (CEC)

Based on the analysis conducted, the clay KTK data obtained were not much different, ranging from 12.36 $cmol^{(+)}/Kg$ to 54.87 $cmol^{(+)}/Kg$. After being matched with the land suitability criteria for oil palm plants according to Djaenudin et al., (2011), the land suitability is classified as S1 and S2.

d. Base Saturation

Based on the analysis data obtained, the base saturation in each land unit has very low criteria. Based on the land suitability criteria according to Djaenudin et al., (2011), land units 1 and 11 have a land suitability class of S1 (Very suitable).

4. Land Conditions in the Field

Based on the results of the research observed in the field, SL 1 and SL 11 have fairly good drainage. This is because the land unit has moderate hydraulic conductivity, moderate water retention capacity and the soil is moist but not wet enough near the surface. Drainage in SL 1 and SL 11 is classified as class S1 (very suitable).
EnglishCoarse rocks are rocks that are in the soil layer to the surface of the soil at a depth of 20 cm and have a size greater than 2 mm which is distinguished by gravel and small rocks expressed in percentage (%). Coarse materials at the research location are classified as class S1 (very suitable). Each land unit has a level of erosion hazard with very low and low-moderate criteria. In SL 1 it can be seen that the level of erosion hazard is very low with surface erosion, in SL 2, SL 3, SL 8, SL 9, SL 10, SL 11 has a very low level of erosion hazard, while in SL 4, SL 5, SL 6, SL 7 has a very severe level of erosion hazard.

The erosion hazard at the research location is classified as class S1 (very suitable), namely in SL 1, while in SL 2, SL 3, SL 8, SL 9, SL 10, SL 11 is classified as class S2 (quite suitable), while in SL 4, SL 5, SL 6, SL 7 is classified as class S3 (marginally suitable). Tanjung Siram has different land slopes ranging from (slope class 0 - 8%), (slope class 8 - 11%), (slope class 15 - 25%), (slope class 25 - 40%). Land units with slopes <8% are included in class S1 and slopes of 8-16% are included in class S2. Land units with slope class S1 are very suitable for cultivating oil palm plants as well as on slope class S2, only in class S2 a little processing is still

needed to maximize the potential of the land. Meanwhile, for the potential for flood hazards, rock outcrops and surface rocks are classified as S1 for all land units

C. Land Suitability Evaluation

In a waya brief land suitability evaluation is a comparison between the land's own capability and the expected land quality (Harjowinego and Widiatmaka,
2007). The core of land suitability evaluation is to compare the criteria or requirements requested by the type of land use to be applied with the nature or quality of the land to be used. The results of the suitability evaluation are in the form of information related to land potential or land suitability class for a particular type of land use. Based on the results of field observations and laboratory analysis, data on the characteristics and quality of oil palm plantation land in each Land Unit (SL) were obtained, more details can be seen in Table 4.

Table 4. Characteristics and Quality of Tanjung Siram Land

Land Characteristics	**SL 1**	**SL 2**	**SL 3**	**SL 4**	**SL 5**	**SL 6**	**SL 7**	**SL 8**	**SL 9**	**SL 10**	**SL 11**
Temperature (tc)											
Average temperature (°C)	25.17	24.57	24.40	23.12	23.15	22.85	22.64	24.47	24.31	24.85	24.80
Water availability (wa)											
Rainfall (mm)	2819.6	2819.6	2819.6	2819.6	2819.6	2819.6	2819.6	2819.6	2819.6	2819.6	2819.6
Length of dry month (month)	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Availability oxygen (oa)											
Drainage	Good	Good	Good	Good	Good	Good	Good	Good	Good	Good	Good
Rooting media (rc)											
Texture	Fine	Fine	Fine	Fine	Fine	Fine	Fine	A bit subtle	A bit subtle	Fine	Fine
Crude material (%)	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%
Soil depth (cm)	>100	>100	>100	>100	>100	>100	>100	>100	>100	>100	>100
Nutrient retention (nr)											
Clay CEC (cmol)	14.85	31.46	27.06	32.73	34.91	38.70	20.35	24.79	54.87	15.07	24.23
Base saturation (%)	5.66	2.90	4.09	3.87	2.35	2.47	4.81	7.17	3.49	8.45	4.82
pH H2O	4.58	4.54	4.55	4.64	4.44	4.48	4.44	4.78	4.95	4.96	4.79
C-organic (%)	1.86	1.17	3.90	2.30	3.77	1.23	2.64	1.35	0.70	1.98	1.03
Danger of erosion (eh)											
	0%-8%	15%-25%	15%-25%	25%-40%	25%-40%	25%-40%	25%-40%	8%-11%	8%-11%	8%-11%	8%-11%
Flood hazard (fh)	Very Low	Low - Medium	Low - Medium	Heavy	Heavy	Heavy	Heavy	Low-Medium	Low-Medium	Low-Medium	Low-Medium
Puddle	F0	F0	F0	F0	F0	F0	F0	F0	F0	F0	F0

Land preparation											
Surface rocks (%)	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Rock exposure (%)	<2	10-Feb	10-Feb	<2	<2	<2	<2	<2	<2	<2	<2

D. Actual Land Suitability Evaluation

Based on field observations and laboratory analysis conducted for oil palm plants in each research land unit. Data information related to actual suitability in each land unit is generated based on the current data information (Table 5).

a. Land Unit (SL) 1

After conducting an actual land suitability assessment in Tanjung Siram at SL 1, the class S3tc,wa,nr was obtained, which is classified as marginally suitable with limiting factors in the form of temperature, water availability, and nutrient retention.

b. Land Unit (SL) 2

After conducting an actual land suitability assessment in Tanjung Siram at SL 2, the class S3tc,wa,nr,eh was obtained, which is classified as marginally suitable with limiting factors in the form of temperature, water availability, nutrient retention and erosion hazard.

c. Land Unit (SL) 3

After conducting an actual land suitability assessment in Tanjung Siram at SL 3, the class S3tc,wa,nr,eh was obtained, which is classified as marginally suitable with limiting factors in the form of temperature, water availability, nutrient retention and erosion hazard.

d. Land Unit (SL) 4

After conducting an actual land suitability assessment in Tanjung Siram at SL 4, the Neh class was obtained, which is classified as not reaching the class with a limiting factor in the form of erosion hazard.

e. Land Unit (SL) 5

After conducting an actual land suitability assessment in Tanjung Siram at SL 5, the Neh class was obtained, which is classified as not reaching the class with a limiting factor in the form of erosion hazard.

f. Land Unit (SL) 6

After conducting an actual land suitability assessment in Tanjung Siram at SL 6, the Neh class was obtained, which is classified as not reaching the class with a limiting factor in the form of erosion hazard.

g. Land Unit (SL) 7

After conducting an actual land suitability assessment in Tanjung Siram at SL 7, the Neh class was obtained, which is classified as not reaching the class with a limiting factor in the form of erosion hazard.

h. Land Unit (SL) 8

After conducting an actual land suitability assessment in Tanjung Siram at SL 8, the class S3tc,wa,nr was obtained, which is classified as marginally suitable with limiting factors in the form of temperature, water availability and nutrient retention.

i. Land Unit (SL) 9

After conducting an actual land suitability assessment in Tanjung Siram at SL 9, the class S3tc,wa,nr was obtained, which is classified as marginally suitable with limiting factors in the form of temperature, water availability and nutrient retention.

j. Land Unit (SL) 10

After conducting an actual land suitability assessment in Tanjung Siram at SL 10, the class S3tc,wa,nr was obtained, which is classified as marginally suitable with limiting factors in the form of temperature, water availability and nutrient retention.

k. Land Unit (SL) 11

After conducting an actual land suitability assessment in Tanjung Siram at SL 11, the class S3tc,wa,nr was obtained, which is classified as marginally suitable with limiting factors in the form of temperature, water availability and nutrient retention.

E. Evaluation of Potential Land Suitability

Potential land suitability is the expected land suitability condition after improvement efforts have been made. Land improvement efforts made must be in line with the level of land suitability assessment that has been carried out. This potential land suitability is the expected condition after being given input related to the level of management or administration that will be applied, so that optimal plant productivity results are obtained. Flood hazards can also affect other limiting factors such as erosion hazards. Erosion can occur due to water flowing over the surface of the land and carrying soil particles to a lower direction. The size and length of the slope are also factors that can cause erosion and even landslides. For this reason, land management actions are needed as a form of prevention to avoid the danger of erosion. Efforts that can be made to prevent and reduce the rate of erosion include making terraces, planting parallel to contour lines and planting ground cover (Rayes, 2007).

Clay CEC is closely related to nutrient availability and is an indicator of soil fertility. Mukhlis (2007) stated that the high and low CEC of soil is determined by the clay and organic matter content in the soil. The value of CEC is influenced by the texture, type of clay minerals in the soil, and the organic matter content of the soil. The higher the clay content, the finer the texture and the greater the CEC of the soil, as well as the organic matter content of the soil, the higher the organic matter content of the soil then the CEC of the land will also be higher.

Other nutrient retention elements that are limiting factors are base saturation and soil pH. Mukhlis (2007) stated that base saturation is related to soil pH value. This is because base saturation is a comparison between base cations and the number of cations that can be exchanged in soil colloids. The smaller the base saturation value, the more acidic the soil reaction or the lower the soil pH. To increase the wet saturation value, liming can be done. This is in accordance with the statement of Hardjowigeno (2007), which states that liming is a common way to increase the percentage of base saturation in soil. Another inhibiting factor found at the research location is the average temperature in the area. Temperature cannot be changed or improved, this is because temperature is a natural condition in the area. At the research location, the limiting factor of temperature is only in one land unit and the average temperature value is only slightly different from the temperature criteria required by oil palm plants. With the improvement or processing actions as explained above, the land suitability assessment in Tanjung Siram will be better than before. Based on the results of the potential land suitability assessment from the analysis data of observations of the quality and characteristics of land for oil palm plants after processing and improvement on each land in Tanjung Siram.

CONCLUSION AND SUGGESTIONS

A. Conclusion

Based onn from the research that has been conducted in Tanjung Siram, Bilah Hulu District, Labuhanbatu Regency, it was obtained and concluded that Tanjung Siram has 11 land units that have actual land suitability classes in land unit 1, namely S3tc, wa, nr, in land unit 2, namely S3tc, wa, nr, eh and in land unit 3, namely S3tc, wa, nr, eh and on land unit 4, namely Neh and on land unit 5, namely Neh and on land unit 6, namely Neh and on land unit 7, namely Neh and on land units 8 namely S3tc,wa,nr and in land unit 9 namely S2tc,wa,nr and in land unit 10 S3tc,wa,nr and in land unit 11 namely S3tc,wa,nr The limiting factors in the actual land suitability class at the research location are temperature, water availability, nutrient retention, and erosion hazard. After improvements are made with good land management, the land suitability class can be improved with the potential land suitability class which was previously classified as S3 increasing to S2 and which was previously classified as S2 can be improved to S1.

B. Suggestions

Based onn the results of the research that has been conducted, it is suggested that for land units that are marginally suitable (S3), improvements need to be made according to the limiting factors found in each land unit. Improvements to these limiting factors are expected to be able to increase the suitability of oil palm plants in these land units.

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