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Converting the Function of Rubber to Palm Oil Plantation to Improve the Economy of the Community in Kampung Dalam Village District of Bilah Hulu, District of Labuhanbatu

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Abstract

This study aims to determine the physical properties of land conversion from rubber land to coconut plantations (cocos nucifera L) in Kampung Dalam Village, Bilah Hulu District, Labuhanbatu Regency. Soil analysis was carried out at the Agricultural Soil Clinic, Agricultural, Fisheries, Forestry Extension Commission (KP3K) Deli Serdang Regency, North Sumatra Province. The method used in this research is a field survey by reviewing and determining the location and determining the location of observation points on the conversion of rubber land to coconut plantations and continuing to take soil samples as material for analysis in the laboratory. Soil sampling with a ring sample with a depth of (20 cm) from the top soil layer. In the land conversion of rubber land into coconut plantations, 4 soil samples were taken with a distance of 100 meters in the field with a random method spread over a predetermined area based on a base map. Parameters analyzed in this study include Bulk Density, Total Pore Space, Field Capacity, Withering Point, Soil Texture. The results showed that the density of the soil mass was 0.17 g.cm³, the total pore space was 45.56 %, the field capacity (%) was 252.07%, the lay point (%) was 252.07%, and the character of the soil at the study site was entered in clay character.

Keywords
rubber field; coconut land; soil physical properties

I. Introduction

Land is an ecosystem in which there is an interaction relationship between its constituent elements which results in a certain ecological balance. And also land is an area that includes all the components of the biosphere, including the atmosphere, soil, source rock, relief, hydrology, plants and animals.(Arsyad, 2000). The transfer of functions to land is currently getting a lot of attention, especially the many uses of land for food plants to make non-food plants. in this case where a case that is often encountered one of which is the conversion of land use into a plant for a plantation, such as oil palm and rubber, and other plantation plants.(Razali, 2015).

The conversion of rubber into oil palm plantations can improve the economy of the community in the village village in the district of Bila Hulu, Labuhanbatu Regency which is very useful in improving the economy of the local community and in an effort to improve the community's economy, the government of the District of Bilah Hulu, Labuhanbatu Regency encourages people to always dig potential natural resources that exist, one of which is in the agricultural sector, to improve self-quality as well as develop potential and can hone skills develop skills and potential to become qualified human resources, national economic improvement can also be supported by managing natural resources.

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And Effort that is used to increase production is by expanding the planting area. The expansion of the planting area requires the community to clear forest areas, all of which are conservation areas, into agricultural land. The conversion of forest land into agricultural land causes a decrease in soil quality. This is due to the more open land which results in a higher erosion rate, and high planting intensity causing the reduction of many soil nutrients. The number of areas that have converted land in North Sumatra, one of which is in the District of Blade Hulu, Labuhanbatu Regency. Where the majority of people's livelihoods in the District of Blade Hulu are farmers. The crops cultivated by farmers in this district are rubber and oil palm.(Hasibuan et al., 2020).

Farmers' responses can be seen to find out that farmers' assessments of agricultural land conversion are continuously being carried out. This is based on the assumption that the rubber cultivation business is starting to become less profitable for farmers and changes need to be made by converting land to oil palm to achieve a sufficient and prosperous life. This response is indicated by a positive response and a negative response. A positive response is shown by farmers if they agree to the conversion of agricultural land. Conversely, a negative response is shown by farmers if they do not agree with the conversion of agricultural land. A negative response has an understanding that they are not ready to accept change and want the original condition(Nurhidayat et al., 2018).

The limitation of productive land causes the extensification of agricultural land to lead to marginal lands. Sandy land is one of the marginal lands chosen, because it is relatively sparsely populated so that the possibility of land use conflicts is relatively small(Agus and Subiksa 2008). The development of the world's average coconut production during the 1999-2004 period reached 52.5 thousand tons/year. Of all the producing countries in the world, Indonesia is the largest producing country, with an average production of 15.6 thousand tons/year, the Philippines ranks second with 13.5 thousand tons/year, but the Philippines' production growth rate is 3.39%/year. , while Indonesia is 1.64%/year(Muslim, 2006). Coconut (Cocos Nucifera L.) is a commodity that has various benefits, including as a raw material for making cooking oil. Coconut is a commodity that has long been a supporter of the life of the Indonesian people. This can be proven from the distribution of coconut commodities in almost all regions of the archipelago (Dirjenbun, 2012).

According to research(Satria, 2015). Rubber plants are plants that are easy to grow but must look at the characteristics of the land that can affect the productivity of the rubber latex. As in the villages in the sub-district of Bila Hulu, Labuhanbatu Regency, the existing rubber plants have decreased the productivity of their rubber latex because the existing land is land that is not suitable for ideal rubber growth and coconut plants are traditional commodities whose distribution has been spread from generation to generation. in all regions of Indonesia, besides that it is an important commodity and has economic value because the leaves, fruit, and stems can be utilized. North Sumatra has a coconut plantation area of 110.276 ha. And almost all of them are people's plantations (Directorate, 2021).

Coconut commodities include plants that are classified as resistant to climate change so that the growth and yield of fruit production is quite stable, unlike other annual plants such as tea, the resultant tea plant is a physiological growth rhythm of leaf shoots which is heavily influenced by climate.(Subandi, 2013).

According to (Salim 2013) in his research, said coconut plants are quite adaptive in terms of the soil medium in which they grow, many plants are very susceptible to soil conditions, nutrient content, water availability, and soil pH, but coconut plants are able to adapt even in nutrient-poor soil media.

Physical properties of the soil certainly need to be known because they greatly affect plant growth and production, determine root penetration in the soil, water retention, drainage, aeration and plant nutrition and affect the chemical and biological properties of the soil. In addition, the physical properties of the soil are taken as the main consideration in determining an agricultural land, where good soil physical properties can improve the environment for plant roots and indirectly facilitate nutrient absorption, so that it is relatively profitable for plant growth (Yamani, 2010).

Based on this explanation, the researcher is interested in carrying out an assessment on the physical characteristics of the land for the conversion of rubber land to coconut plantations (Cocos nucifera L) in the village village in the district of Bila Hulu, Labuhanbatu Regency. This is based on the assumption that rubber cultivation is starting to become less profitable for farmers and changes need to be made by converting land into coconuts to achieve a sufficient and prosperous life. This response is indicated by a positive response and a negative response. And so that researchers also know the problems in the research conducted. Soil physical properties are environmental elements that greatly affect the availability of water, soil air and indirectly affect the availability of plant nutrients.

This study also aims that researcher want to know that the physical properties of the land are converted from rubber land into coconut plantations (Cocos nucifera L) in Kampung Dalam Village, Bilah Hulu District, Labuhanbatu Regency. Soil analysis was carried out at the Agricultural Soil Clinic of the Agricultural, Fisheries, Forestry Extension Commission (KP3K) Deli Serdang Regency, North Sumatra Province. This description and in relation to the interests of sustainable agricultural development which refers to the use of land resources to produce a prosperous community economy, it is felt that it is important to study the degradation of some physical properties of the soil due to the conversion of rubber plantations to coconut plantations (Cocos Nucifera L) in the village. Inner Village, Bilah Hulu District, Labuhanbatu Regency. Just like the opinion of(Wu et al., 2016). That the physical properties of the soil can also greatly influence the restoration of vegetation in a semi-arid Loess Plateau. Understanding how converting agricultural land to pasture affects soil physical properties is critical during long-term restoration of natural vegetation in chronological order.

II. Research Method

This study uses descriptive basic methods, which according to (Rangraja 2013) descriptive research is research that describes the characteristics of a population about the observed phenomena. Descriptive research is a type of research that aims to present a complete picture of social settings. This research was carried out from January to March 2022. The research location was carried out in Kampung Dalam Village, Bilah Hulu District, Labuhanbatu Regency, North Sumatra Province at an altitude. Soil analysis was carried out in March 2022 at the Agricultural Soil Clinic of the Agricultural, Fisheries, Forestry Extension Commission (KP3K) Deli Serdang Regency, North Sumatra Province. Types and Data Collection In data acquisition, there are various sources that can be accessed by researchers to produce information.

The material used in this study was soil planted with coconut (Cocos nucifera) in Kampung Dalam Village, Bilah Hulu District, Labuhanbatu Regency, North Sumatra

Province. The tools used in this research include Global Positioning Service (GPS), Soil Drill, Hoe, 1kg Plastic, Rubber.

The method used in this study is a free grid survey method at the semi-detail survey level (observation density of 1 sample per 100 meters). Implementation of Soil sampling as many as 4 sample points with a distance of 100 meters in the field with a randomly distributed method with an area that has been determined by referring to the base map(Rauf and Harahap, Optimization of Agricultural Land Using Biomass Agents 2019)Soil samples were taken in a zigzag manner at a depth of 0-20 cm. Coordinates were read on the GPS and measured the effective depth of the soil with an altitude of 400-600 meters above sea level from the sampling location. Parameters analyzed in this study include Bulk Density, Total Pore Space, Field Capacity, Withering Point, Soil Texture. Observation of soil color using color standards from the Munsell soil color chart book which is expressed in 3 units, namely Hue, Value and Chroma (Hanafiah, 2005).

III. Result and Discussion

Based on the results of this study, the characteristics of the physical properties of land converted from rubber to coconut plantations (Cocos Nucifera L) in Kampung Dalam Village, Bilah Hulu District, Labuhanbatu Regency are clay soil so that the soil is suitable for coconut plantations. This causes farmers to be able to cultivate crops in the area well. One of the cultivated commodities is coconut. Clay textured soils have a greater ability to hold water than sandy textured soils. This is related to the surface area of the adsorbent, the finer the texture, the greater the water storage capacity. Soil physical properties certainly need to be known because it greatly affects plant growth and production, determines root penetration in the soil, water retention, drainage, aeration and plant nutrition and affect the chemical and biological properties of the soil. In addition, the physical properties of the soil are taken as the main consideration in determining an agricultural land, where good soil physical properties can improve the environment for plant roots.

3.1 Soil Mass Density (Bulk Density)

The results of the analysis of the physical properties of the soil on the conversion of rubber land to coconut plantations (Coco Nucifera L) in the village of Kampung Dalam, Bilah Hulu District, Labuhanbatu Regency in (Table 1), the results obtained in sample A1 has a soil mass density of 0.15 g.cm^3 , sample A2 has a soil mass density of 0.18 g.cm^3, sample A3 has a soil mass density of 0.14 g.cm^3, and sample A4 has a soil mass density of 0.21 g.cm^3. and obtained the average of the 4 samples below with a soil mass density of 0.17 g.cm^3.according to(Sarif 1984)included in the criteria for light soil mass density.

Table 1. Results of Soil Mass Density Analysis (g.cm^3) on coconut land

Soil Sample	Bulk Density (g.cm^3)	Criteria
A1	0.15	Light
A2	0.18	Light
A3	0.14	Light
A4	0.21	Light
Average	0.17	Light

According to(Hardjowigeno, Soil Science 2007)The density value of mineral soil mass ranges from 1-1.6 g/cm^3, the range between 1.22-1.80 g/cm^3 is generally found on sandy soil and sandy loam textures. In addition to soil texture and the amount of pore space, the density of soil mass is also influenced by the content of organic matter, with the

presence of organic matter in the soil, it will reduce the density of soil mass so that it dissolves soil minerals.(Martin, Reyes and Taguas 2016). And also according to(Hardjowigeno, Soil Science 2003)states that mass density greatly affects the physical properties of the soil, such as porosity, strength, bearing capacity, the ability of the soil to store water, drainage, etc.(Hanafiah 2010)It also states that if a soil has a high level of water content in absorbing groundwater, then the density of the soil will also be low because the pores in the soil are also large, it will be easier to enter water in the soil aggregate.

3.2 Total Pore Space

Table 2. Results of Analysis of Total Soil Pore Space (%) on coconut land

Soil Sample	Porosity (%)	Criteria
A1	43.60	Not good
A2	44.22	Not good
A3	46.22	Not good
A4	48.22	Not good
Average	45.56	Not good

The results of 4 soil samples that have been analyzed in the laboratory in (Table 2) show that sample A1 has a porosity of 43.60%, A2 has a porosity of 44.22%, A3 has a porosity of 46.22%, and A4 has a porosity of 48.22. %. And the average of the 4 samples has a porosity of 45.56%, it can be seen that the Characteristics of the Physical Properties of Land Converted from Rubber Land to Coconut Plantations (Coco Nucifera L) in Kampung Dalam Village, Bilah Hulu District, Labuhanbatu Regency has a porosity character (total pore space) which is not good(Brady 1990).

This is because at the time of land clearing this coconut plantation uses a land burning system. The burning of the land causes the empty pore space to be filled with ash resulting from the combustion so that the pore space (porosity) is reduced and undergoes compaction. Burned organic matter becomes ash which causes soil compaction, because the empty pore spaces are filled with ash from combustion, so the total pore space (porocytes) is reduced.(Defari and Adinugroho 2009).

3.3 Field Capacity

Table 3. Results of Field Capacity Analysis (%) on coconut land

Soil Sample	Field Capacity (%)	Criteria
A1	253.22	Currently
A2	244.32	Currently
A3	265.22	Currently
A4	245.52	Currently
Average	252.07	Currently

The results of the field capacity analysis can be seen in (Table 3). The results of the analysis of the field capacity (%) of the soil in the conversion of rubber land to coconut plantations (Coco Nucifera L) in the village of Kampung Dalam, Bilah Hulu District, Labuhanbatu Regency, obtained in sample A1 with a field capacity of 253.22%, sample A2

with a field capacity (%) 244.32 %, sample A3 with field capacity (%) 265.22%, sample A4 with field capacity (%) 245.52%, and on the average of the 4 samples obtained Field capacity (%) 252, 07% of these results indicate that the land from the conversion of rubber land to coconut plantations has a medium field capacity.

The factor that affects the field capacity of a high land is the high porosity of the soil, so the ability to hold water is also high(Adhi Wijaya 1998)and also the factor that makes the field capacity of a soil low, which is caused by the water holding capacity of clay-textured soils greater than sandy loam and sandy loam textured soils.(Oteng Haridjaja 2013). According to(WA Jury 2001)In most cases, the soil's water holding capacity is considered to be equivalent to the field capacity water content. Field capacity is defined as the soil water content in the field when the drainage water has stopped flowing due to the force of gravity after the soil was completely saturated.

3.4 Withering Point

The results of the field capacity analysis can be seen in (Table 3). The results of the analysis of the wilting point (%) of the land on the conversion of rubber land to coconut plantations (Coco Nucifera L) in the village of Kampung Dalam, Bilah Hulu District, Labuhanbatu Regency, obtained in sample A1 with a wilting point of 127.22%, sample A2 with a wilting point (%) 125.22 %, sample A3 with wilting point (%) 126.47%, sample A4 with wilting point (%) 122.22%, and on the average of the 4 samples the wilting point (%) 252, 07% of the results showed that the land from the conversion of rubber land to coconut plantations had a moderate wilting point.

Table 4. Results of Wilting Point Analysis (%) on coconut land

Soil Sample	Withering Point (%)	Criteria
A1	127.22	Currently
A2	125,22	Currently
A3	131.22	Currently
A4	122.22	Currently
Average	126.47	Currently

According to the opinion of(Palupi ER 2008)Long-rooted plants will have a better ability to absorb water compared to short-rooted plants. Plant factors greatly affect the moisture content of the temporary wilting point because plants absorb water from plant roots for the plant growth process. This is in accordance with research(Suharyati 2010)In addition to the nature of the soil, plant factors also greatly affect the amount of water that can be absorbed (absorption or absorption of liquids into other liquids or solids, so that the two merge) plants from the soil. This is in line with research(Solichatun 2005)that the water used by each plant is different depending on its growth phase and the ability of plant roots to absorb water varies according to the water content available in the growing media.

3.5 Soil Texture

Table 4. Results of Soil Texture Analysis (%) on coconut land

Soil Sample	Texture (%)			Texture Class
	Sand(%)	Dust(%)	clay(%)	
A1	35	24	41	clay
A2	24	28	48	clay
A3	26	28	48	clay

A4	29	22	49	clay
Average	28.5	25.5	46.5	clay

From the results of the analysis of the physical properties of the soil on the conversion of rubber land to coconut plantations (Cocos Nucifera L) in the village of Kampung Dalam, Bilah Hulu District, Labuhanbatu Regency in (Table 1), the results of Texture Analysis on coconut land have been classified and texture class classification has been carried out. land through the USDA (United State Department of Agriculture) system as shown in (Figure 1). After getting the average texture of sand, dust, clay from several samples that have been obtained the texture class on the land conversion of rubber land into coconut plantations in the village village in the sub-district of Batang Hulu, Labuhan Batu district, the clay texture class is obtained.

Based on research(O Haridjaja 2013)Soil texture greatly affects the ability of the soil to hold water, clay-textured soils have a greater ability to hold water than sandy-textured soils. This is related to the surface area of the adsorbent, the finer the texture, the greater the capacity to store water. Sandy loam textured soils have The bulk density is greater than the clay-textured soil, in sandy soils even though the pore space is small, air and water movement is very fast because of the dominance of micro pores.

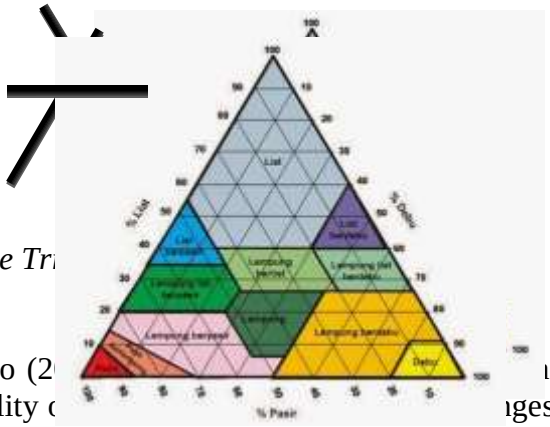

Figure 5. *Soil Texture Tri*

3.6 Economic benefits

According to Notohadiprowiro (2 ient resource that has relatively constant availability c nges in area due to natural processes (sedimentation) and processes (reclamation) are very small. In addition, land suitability in accommodating community activities also tends to be specific because land has physical differences such as rock type, mineral content, topography and so on. When the demand for land increases even though its availability is increasingly limited, what the community does is change land use from one use to another or what is commonly called land conversion.

Rubber plants are relatively easy to cultivate, but the management of rubber plantations often experiences problems, including the problem of plant-disturbing organisms, especially disease problems where all parts of the rubber plant are the target of infection from a number of diseases ranging from root fungus, tapping disease, upas fungus, and leaf fall disease. where the rubber plant is old, the skin is running out and takes a long time for new skin. Besides that, the erratic weather factor greatly affects the production of rubber.

In the village of Kampung Dalam strongly supports the development of oil palm cultivation, because oil palm is one of the most important agricultural products today, because oil palm plantations have an important meaning in the socio-economic aspects of people's lives apart from being the country's foreign exchange income, it also has various functions and advantages. oil palm plantation and see the condition that the plantation sub-

sector has an important role or impact, among others, on socio-economic development in the form of opening up employment opportunities, increasing the income of the community both in the plantation environment and the local community, especially those working in the oil palm plantation. The creation and expansion of job opportunities continues to be pursued, especially through increasing and equitable development so as to be able to absorb labor and increase people's incomes which will eventually lead to the development of a people's economy. In addition, oil palm plantations can also increase people's income slightly. With the increase in income, it is also hoped that a better condition will be achieved in meeting their needs.

IV. Conclusion

Based on the results of the research that has been carried out, it can be concluded that the results of this study are that the Physical Characteristics of Soil for Converting Rubber Land to Coconut Plantation (Cocos Nucifera L) in Kampung Dalam Village, Bilah Hulu District, Labuhanbatu Regency is clay so the soil is suitable for coconut plantations. This causes farmers to be able to cultivate crops in the area well. One of the cultivated commodities is coconut. Characteristics of Physical Properties of Soil Converted from Rubber Land to Coconut Plantation (Cocos Nucifera L) in Kampung Dalam Village, Bilah Hulu District, Labuhanbat Regency. Clay textured soils have a greater ability to hold water than sandy textured soils this is related to its adsorbtive surface area, The finer the texture, the greater the water storage capacity. The soil texture at the research site is included in the clay character by analysis using the USDA system, which can be seen in Figure.1. Physical properties of the soil at the research site, such as a soil mass density of 0.17 g.cm, are included in the criteria. light weight, the total pore space has a porosity of 45.56 % as referred to in the poor criteria, field capacity has a field capacity (%) 252.07% referred to in the moderate criteria, the wilting point has a wilting point (%) 252.07% which is referred to in medium criteria. With the description above, it can be seen that in the deep village, the land potential is quite good for cultivating oil palm. This can develop the economy of the surrounding community, because oil palm is one of the most important agricultural products today, because oil palm plantations have an important meaning in aspects of the socio-economic life of the community in addition to being the country's foreign exchange income, it also has various functions and advantages of oil palm plantations.

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