THE AMOUNT OF CARBON STOCKS OF OIL PALM PLANTATIONS IN CARBON STOCKS CONTRIBUTOR COMPONENT IN FLAT SOIL CONDITIONS AND SOIL CONDITIONS BUMPY

[1]MUHAMMAD SYAFI'I, [2]YUSNI IHKWAN SIREGAR, [3]MUBARAK, [4]HIDAYAT PRATAMASARI

Postgraduate Program in Environmental Sciences, Riau University
E-mail: Hidayat_pratama@yahoo.com

Abstract - Indonesia's forest area in the year 2017 that is an area of 93.6 million ha of forests and deforestation in the year 2017 amounted to 64.3%, while palm oil exports from year to year has increased significantly, it can be seen from the average rate of growth of oil palm area during 2004 - 2014 amounted to 7.67%, and the production of palm oil increased by an average 11.09% per year. The approach of this research is quantitative research conducted using allometric equations while observation and measurement data is done directly on the object of study (the flat surface and corrugated surface) with a number of observation points as much as eight points at once treated as replications. The results of the study and research of data processing carbon reserves of oil palm trees on a flat surface and a bumpy surface is the total carbon stocks stored on a flat surface is equal to 85, 36 tons / ha, while the total carbon stocks on bumpy surfaces amounted to 82.41 tonnes / ha. The average total carbon stocks contained undergrowth on a flat surface is 0.95 tons / ha while the bumpy surface was 1.16 tonnes / ha. The average total carbon stock of litter found on a flat surface is 1.06 tons / ha while the bumpy surface was 1.28 tonnes / ha. The average total soil carbon stocks contained on a flat surface and a bumpy surface is 0.0031 t / ha. The average total carbon stocks are palm trees on the flat surface is 79.73 tons / ha while the bumpy surface is 83 tonnes / ha. While the value of carbon stocks benefit from the palm trees in the plantation PT. To Chisel Pelalawan amounted Rp.10.206.380.810,-.

Keywords - Palm Oil, Carbon Stock, Value Benefits of Carbon, Mineral

I. INTRODUCTION

Forests have only seen from the results in terms of wood just that it makes the forest continues to be damaged, such as illegal logging that has not been controlled. Forest land conversion such as farming, agriculture and human settlements may also be one reason forests continue to decline and make the higher release of carbon that have an impact on climate change, one of which for Greenhouse Gases.
The plants in the forest using CO2 in the process of photosynthesis and produce oxygen (O2) and energy, most of the energy stored in the form of plant biomass. The forest function will reduce greenhouse gases in the atmosphere (MacDicken, 1997 in Cesylia, 2009). Almost 50% of the biomass is composed of carbon (Brown, 1997). Estimation of forest biomass can also be used to estimate the amount of carbon absorbed by forests, Palm trees is an annual plant that has the potential in the absorption of carbon emissions. Age palm plant could reach more than 20 years. Carbon stored in oil palm plantations will be amended in line with the growth and development of plants. The presence of plant metabolism and absorption of nutrients by the roots from the soil would lead to increased plant growth. The rate of plant growth and carbon stocks will be affected by the condition of soil fertility as well as the topography of the plant where it is located.

II. EXPERIMENTAL DETAILS

Oil palm plantation PT. Guna Dodos is a privately owned oil palm plantation, roomates Began operations in 1987 with concessions as large as 887 ha. Administratively oil palm plantations PT. Guna Dodos , located in Seikijang Village, Bandar Seikijang District, Pelalawan Regency, Riau Province.The oil palm plantation area of PT. Guna Dodos , it is located on a plain called peneplain with a flat to wavy region. The coordinate points taken in this study are N 000 25'21.73 ". E 1010 37'02.55" profit from the flat surface areas while for areas with corrugated surfaces taken at the coordinates N 000 2605.70 ". E 1010 3708.91".

No.	Parameters	Tools and Materials	method
1	plants above soil	quadrant wood size 50 x 50 (cm), Scales, drying oven, scissors	In situ and ex there
2	litter	quadrant wood size 50 x 50 (cm), Scales, drying oven, scissors	In situ and ex there
3	Land with a depth of 0-5 (cm) and 5- 15 (cm)	iron quadrant size 20 x 20 x 5 (cm) and size 20 x 20 x 5 (cm), wood size 50 x 50 (cm), saws, hoes, hammers, wooden blocks, scales, dryer oven	In situ and ex there

Materials and tools and methods used in the sampling used in this study can be seen in Table 3. Population and Samples. The population in this study is oil palm

plants on the plantations of PT. Guna Dodos use with an area of 887 ha with a population of 136 trees / ha. The first sampling point is on the third row of the front edge and the left side of the block, while the next observation point is taken in the 12th tree from the previous observation point of the which is calculated to the right of the oil palm tree the which is first formed to form S until it Reaches eight observation points in each block

III. RESULTS AND DISCUSSION

3.1 Carbon Stock of Oil Palm Plantations On Donors Component Carbon Reserves in Soil Condition Tanah Datar and Conditions Corrugated.

The results of calculations of carbon stocks lower plants contained in Annex 5a and briefly can be seen in Table 10. Carbon stocks undergrowth highest value obtained in Zone 3 to the flat surface and Zone 2 on bumpy surfaces. While the lowest value was found in Zone 4 on a flat surface and Zone 3 on bumpy surfaces.

The results of calculations of potential reserves of carbon in oil palm plantations PT. Guna Dodos Pelalawan on to two observation plot is flat and bumpy as attached in Appendix 5.

Table 10. Carbon stocks undergrowth Bumpy and Flat

Cadangan karbon tumbuhan bawah (ton/ha)								
No pokok	Bergelombang ZONA 3				Datar ZONA 2			
	1	2		4	1		3	4
1	0,26	0,28	0,88	0,24	0,28	0,12	0,20	0,15
2	0,73	0,36	0,16	0,22	0,34	0,27	0,13	0,20
3	0,14	0,40	0,15	0,15	0,11	0,30	0,37	0,12
4	0,52	0,16	0,94	0,31	0,24	0,14	0,81	0,30
5	0,32	0,28	0,15	0,30	0,40	0,18	0,75	0,14
6	0,22	0,30	0,13	0,15	0,18	0,12	0,12	0,10
7	0,25	0,21	0,14	0,21	0,16	0,60	0,13	0,20
8	0,12	0,29	0,11	0,28	0,12	0,15	0,94	0,17
rata-rata	0,32	0,28	0,33	0,23	0,21	0,23	0,43	0,17
total	1,16		ton/ha			0,95	ton/ha	

Information:

Zone 1 (gawangan life). Zone 2 (gawangan dead), Zone 3 (short rumpukan), Zone 4 (disc palm).

Table 10 shows that the average yield of total carbon stocks contained in the plant under a bumpy surface was 1.16 tonnes / ha and average total carbon stocks contained in the plant under a flat surface is 0.95 tons / ha.

Research conducted by Yulianto 2015 suggests that the carbon content stored in plant biomass under oil palm plantations PT biggest DDP are in the age group 0-5 years amounted to 5.22 tonnes ha-1. The carbon content stored biomass was lowest for the age group> 20 years of 0.12 tons ha. Increasing age of oil palm plantations, it is increasingly hampered the growth and development of plants under. Growth and development of plants under hampered because of the competition in getting sunlight for photosynthesis and is also influenced by the contours of the land where palm trees grow.

According to Effendi (2012) states that thinning activities carried out on the stand, either on the trunk, branches and twigs also affect the growth of plants under. It is related to the intensity of sunlight that can be accepted by the undergrowth. The more sunlight received by plants, means the better the process of photosynthesis in plants. This is because in the undergrowth, and the carbon content of the biomass is influenced by the composition of the vegetation under the constituent. Similarly, the carbon content and biomass in the litter that is influenced by its components, such as rotting wood, leaves, and twigs (Asril 2009).

The average yield of total carbon stocks that are on a bumpy surface and a flat surface after tested using SPSS for t-test proved to have results that are not significantly different from each other between the blocks. The results did not differ significantly demonstrated that topography in oil palm plantations do not have a large impact on carbon stocks derived from the undergrowth.

The calculation result of litter carbon stocks contained in Appendix 5b and briefly can be seen in Table 11. The carbon stocks in litter highest score get in Zone 1 and Zone 3 bumpy surface to a flat surface. While the lowest value in get in Zone 4 to the surface bumpy and Zone 4 on a flat surface.

Table 11. Reserves of litter carbon Flat and Corrugated

Cadangan karbon serasah (ton/ha)								
No pokok	Bergelombang ZONA 3				Datar ZONA 2			
	1	2		4	1		3	4
1	0,16	0,21	0,15	0,70	0,18	0,33	0,37	0,70
2	0,27	0,32	0,11	0,19	0,26	0,30	0,12	0,19
3	0,48	0,26	0,15	0,22	0,11	0,28	0,16	0,22
4	0,50	0,21	0,35	0,30	0,16	0,23	0,35	0,30
5	0,24	0,17	0,75	0,30	0,18	0,18	0,10	0,30
6	0,18	0,24	0,69	0,22	0,18	0,16	0,50	0,22
7	0,34	0,39	0,25	0,24	0,42	0,56	0,31	0,24
8	0,70	0,20	0,50	0,17	0,40	0,19	0,25	0,17
rata-rata	0,38	0,25	0,36	0,29	0,23	0,27	0,27	0,29
total	1,28		ton/ha				1,06	ton/ha

Information:

Zone 1 (gawangan life). Zone 2 (gawangan dead), Zone 3 (short rumpukan), Zone 4 (disc palm).

Sample t-test of litter on bumpy surfaces and flat surfaces (Appendix 6), also getting the results were not significantly different between the two blocs observations. It has been suggested that the difference in topography of oil is not a concrete impact on the results of the sample acquisition litter carbon stocks.

Obtaining carbon stocks for the sample of litter found on a flat surface is 1.06 t / ha, while the carbon stocks on the bumpy surface of 1.28 tons / ha. From the results using t-test obtained were not significantly different between flat surface with undulating. This suggests that the form of the management carried out against oil palm plantations do not have a significant impact on the results of carbon stocks.

Factors causing varying the amount of litter caused generally occurs due to the addition of litter biomass along with the addition of aged trees and canopy density. Canopy density or stand a factor influencing forest litter fall because of competition for light. The more dense a stand or canopy will result in the amount of litter that is more because of the trees that grow in the forest rather tight-cabng quickly release branches and leaves from the bottom, because the light is not enough for him to photosynthesis. In addition to the addition of aged trees and canopy density of litter dropping litter is also affected in both quantity and quality is influenced by environmental factors (climate, elevation, soil fertility), the type of plant and the time (season and age of stand). Proctor (1983) in Yeni Aprianis (2011). Productivity litter also influenced vegetation and rainfall. Rainfall affects the physiology of vegetation because of higher rainfall, the lower the fallen leaves, twigs, flowers and fruits, at the time of high rainfall will increase the evaporation of moisture leaves will be decreased so that the leaves stay fresh and not easily fall T-test for the soil samples contained in the flat and corrugated surfaces indicate that both blocks were not significantly different observations. It has been suggested that the pattern of land management is done on the palm trees did not have a significant impact on total carbon stocks on land. Other studies estimate the content of carbon stock land on the condition of land in Sumatra, shows that the carbon content of the soil is average for secondary forests (0.247 tons / ha), land shrubs (0.223 tons / ha) and farm (0,201 ton / ha). (Van Noordwijk, and Brouwer in Hariyadi 2005).

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