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Relationship Characteristics Soil, Fertilization and Outcome of Rice in Village Lubuk Pinang, Mukomuko

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ABSTRACT

This study aims to determine the close relationship between the characteristics of paddy soils and rice yields in Lubuk Pinang, the Manjuntio Air Irrigation area, and to determine the level of applied technology of farmers and rice yields in Lubuk Pinang, the Air Manjuntio Irrigation area. This research was conducted in April 2018 until June 2018 in Lubuk Pinang, Lubuk Pinang District, Mukomuko Regency. The study was conducted by survey method. Data was collected through direct observation in the field and soil analysis at the Soil Science Laboratory of Bengkulu University. The results showed that the coefficient regression soil pH (X_1) is 0.208 to 0.875 sig t values are not real in the statistics. The regression coefficient cation exchange capacity (X_2) is -0.018 with t sig value 0,781. Regression coefficient peat depth (X_3) is -0.002 to 0.814 sig t values are not real in the statistics. Regression coefficient levels of soil organic C (X_4) is -0.507 to 0.307 sig t values are not real in the statistics.

Keywords: rice, peat, production, C-organic, peat depth, pH

INTRODUCTION

Lowland rice (*Oryza sativa* L.) It is the main food crop in Indonesia. About 90% of Indonesia's population uses rice as a staple food. The contribution of rice in filling the nutritional needs is even greater at the lower-income level of the population (Koswara & Sutrisno, 2009). Rice is a food source of energy that has a carbohydrate content is high, but protein a low. The nutritional content of rice per 100 g of material is from 0.40 to 7.70 g fiber, 6.93 to 8.70 g protein, 0.58 g of fat, and 79.34 g carbohydrates (Suliantini *et al.*, 2011). Based on BPS data, national rice production in 2014 reached 70.846 million tons and increased in 2015 to 75.397 million tons, this increase in production has not been able to meet national consumption needs, whereas for rice production in Bengkulu decreased from 5.93 million tons in 2014 and 5.78 million tons in 2015. Decreasing the amount of production, which reached 1.5 million tons, is something that must be increased so that the need for rice is always fulfilled (BPS 2015).

Peatlands are classified as marginal land, and *fragile* with productivity is usually low and very

easily damaged. Agricultural development on peat swamp to support sustainable development requires careful and meticulous planning, the application of appropriate technology, and proper management. Conservation and optimization of peat swampland use according to its characteristics require information on type, characteristics, and distribution (Widjaja, 1992). Whereas for mineral soils, the productivity level is quite good, because the pH of the red soil is better than peat soil, so farmers use this land more than peat, both in terms of processing and the level of production produced by planted crops.

Lubuk Pinang Village, which is one of the sub-districts included in the administrative area of the Mukomuko Regency. This sub-district is located at an altitude of 14-32 meters above sea level, almost all of its territory is crossed by a watershed, known as the Air Montino river. The majority of the population work as oil palm farmers and rice farmers. The area of rice cultivation in this area is not known with certainty, but based on BPS data, it is known that the total harvest was 26,100 tons in 2015 in the Lubuk Pinang sub-district (BPS, 2017).

Land suitability is a description of the level

of land suitability against a particular use. The land suitability assessment will be carried out in two conditions, actual conditions and potential conditions. The actual condition assessment is done during the field survey, while ratings of condition potential to do when making improvement an area (FAO, 1976).

Actual land suitability is land suitability based on data on biophysical properties of land or land resources before the land is given the inputs needed to overcome obstacles. Potential land suitability illustrates land suitability that will be achieved if improvements are made (Ritung *et al.*, 2007). Determination suitability is done by comparing the characteristics and quality of land with land use requirements for a particular crop (Wati *et al.*, 2013).

Land suitability value is determined by the presence of inhibiting factors and the level of these inhibiting factors. The potential and suitability of peatlands for agriculture are very limited by the main factors, namely drainage, carrying capacity, maturity, and thickness of peat soils and chemical properties which are generally classified as low to very low, especially with *substratum* sulfidic material and quartz sand (Kartawisastra, 2016). Nagur's research results (2017) produce that in organic land, the correlation values are obtained between KL, organic C, total N, available P, K available KPK, Eh, and soil hardness to production. Moisture content was positively correlated not significantly with rice production ($r = 0.385$), organic C was positively correlated not significantly with rice production ($r = 0.268$), total N was not positively correlated significantly with rice production ($r = 0.295$), P provided negative correlation significantly with rice production ($r = -0.302$), available K is not a significantly negative correlation with rice production ($r = -0.283$), KPK has no positive correlation with rice production ($r = 0.253$), Eh has no positive, positive correlation with rice production ($r = 0.023$), soil hardness is positively correlated not significantly with rice production ($r = 0.042$).

This study aims to determine the close relationship between soil characteristics, level of N, P, K, Dolomite fertilization and rice yield in Lubuk Pinang-Mukomuko District

MATERIAL AND METHOD

This research was conducted in April 2018 until June 2018 in Lubuk Pinang, Lubuk Pinang District, Mukomuko Regency. Analysis of variables through direct observation in the field and soil analysis at the Soil Science Laboratory, Bengkulu University.

The materials used in this research are annual rainfall data and research reports, farmer interview forms, and rice yield data. The tools used in this research consisted of field knives, ground drill, folding meter, GPS

(Global Positioning System), Munsell's book *Soil Color Charts*, and other tools needed in the field. Laboratory instruments for chemical analysis of soil samples.

The stages of the field survey are the stages of collecting soil, agro-climate, and crop data that can be measured directly in the field using survey methods, as well as interviewing farmers to obtain data on rice yields. Analysis and interpretation of data obtained through the chemical analysis of soil samples in the laboratory to obtain chemical data of land sites. After all, data has been collected, proceed with data processing with multiple linear regression methods to determine the relationship of each unit of research land.

In the pre-survey phase, among others: gathering the necessary equipment, collecting the materials used, completing all licensing documents to support the smooth implementation of research as a basis for conducting field surveys. Field surveys include several activities, namely observation, measurement, soil sampling, to determine the physical and chemical variables of the land and farmer interviews to get other supporting data. At this stage, the data obtained were analyzed using multiple linear regression methods to determine the relationship of some land characteristics with rice production. The plant variables observed in the field are rice yields that describe the number of farm products harvested in one area of land in one production cycle.

Soil variables observed in the field include soil depth, variables analyzed in the laboratory are nutrient retention (CEC, pH, and C-Organic). Climate factors are supporting data that use secondary data, including air humidity, air temperature, and rainfall obtained from the local climatology station.

RESULT AND DISCUSSION

Administratively, Lubuk Pinang District is located in Mukomuko Regency. Geographically, the area of Lubuk Pinang District in the north is bordered by Pesisir Selatan Regency, West Sumatra Province, in the South, bordered by Air Manjuntjo District, in the east bordering V Koto District, and in the West bordering Koto XIV District. The width of the Lubuk Pinang sub-district is 9271 ha, the topography of this sub-district tends to be flat with a height of between 14 - 32 meters above sea level (BPS, 2017).

The type of soil that develops in this area is dominated by Histosol (peat) and Ultisol, and peat soil is soil formed from a pile of remnants of dead plant tissue that formed in anaerobic conditions due to very high water saturation. The main characteristics of peat soils are rich in organic matter (C-Organic > 18%), thickness above 50 cm, nutrient-poor, and high acidity (Agus & Subiksa, 2008).

Farmers at the study site used several rice varieties, namely Inpari-32, Ciliwung, IR-64, Mekongga, and Ciherang. Based on the description of Inpari-32 variety has an average yield of 6.3 tons/ha with a potential yield of 8.42 tons / ha, ciliwung has an average yield of 4.8 tons/ha with a potential yield of 6.5 tons / ha, IR-64 has an average yield of 5.0 tons/ha with a potential yield of 6.0 tons/ha, hollow has an average yield of 6.0 tons/ha with a potential yield of 8.4 tons/ha, and Ciherang has an average yield of 6 tons/ha with a potential yield of 8.5 tons/ha. While based on the results of the study, it was seen that the production of Inpari 32 varieties ranged from 4.89 to 9.52 tons ha, Ciliwung varieties ranged from 2.93-8.86 tons/ha, IR-64 by 6.84 tons/ha, cavity ranged from 2, 22-2.24 tons/ha, and Ciherang ranges from 2.25-7.43 tons/ha. While in terms of land management, there are respondents who manage the land traditionally using a hoe or in a modern way using a tractor. In controlling pests, farmers at the research location prefer to use chemical control.

The research data observed included soil pH, CEC, C-organic, peat depth, N, K, P, dolomite fertilizer, and rice production. Soil pH, CEC, and C-organic values were analyzed at the Soil Science Laboratory of the University of Bengkulu, while peat depth and rice production were measured in the field.

The results showed that the pH value of peat ranged from 4.7 to 6.1, with an average of 5.51. The criteria for soil pH values at the study site are quite acidic. The results of the study are higher than the

statement of Rachim (1995) that the yield of tropical peatlands is generally high (pH 3-5), caused by hydrolysis of organic acids, which are dominated by fulvic acid and humic. This is presumably because farmers at the study site used dolomite lime as fertilizer, thereby increasing the pH value of peat soils. According to Aryanti *et al.* (2016), dolomite limestone contains Ca and Mg elements, where both of these elements shift the H⁺ position on the colloidal surface, thereby neutralizing the acidity of the soil. Besides, according to Nurhayati (2014), the hydrolysis reaction can release OH⁻ ions which affect the increase in soil pH. In line with the statement of Maftu'ah *et al.* (2013) that lime provides OH⁻ supply to the soil solution, which reacts with H⁺ to water and causes H⁺ levels to decrease so that soil pH increases.

CEC values at the study sites ranged from 29.6 - 81.90 Cmol (+) / kg with an average of 60.55 Cmol (+) / kg. Criterion CEC value at the research location is high to very high. According to Kumalasari *et al.* (2011) that the high organic matter can increase the absorption and cation exchange capacity. This happens because the weathering of organic material will produce humus (organic colloids), which are a source of negative soil charge so that it has a surface that can hold nutrients and water. With increasing cation exchange capacity, it can hold nutrients.

C-organic levels in the study area ranged from 37.70% - 53.34%, with an average of 45.56%. The value of C-organic content at the research location is

Table 1. Results of observations of pH, CEC, C-Organic, peat depth, and rice production at the study site

Site samples	pH	CEC (cmols+)/k	Peat Depts (cm)	Fertilizers Applications (kgs/ha)				Rice Yields (tons/ha)
				N	P	K	Dolomite	
1	6.1	29.68	36	200	150	100	600	7.2
2	5.9	34.54	21	200	200	200	750	9.5
3	6.3	38.02	15	200	200	200	750	8.9
4	6.1	43.60	84	200	150	150	500	6.8
5	5.8	42.18	76	100	75	50	100	2.9
6	4.7	50.43	85	150	100	150	500	6.7
7	4.7	69.03	129	50	50	50	200	2.2
8	5.0	80.16	107	200	150	200	750	7.5
9	5.1	63.80	103	75	50	50	200	2.6
10	5.4	66.12	167	150	100	100	400	5.6
11	5.1	77.72	153	50	50	50	300	2.8
12	5.6	74.81	175	50	50	50	150	2.5
13	5.6	81.90	246	100	75	75	200	3.9
14	5.6	77.74	335	100	75	75	600	4.8
15	5.7	78.59	370	100	100	100	500	4.9
Averages:	5.51	60.55	140.13	128	105	107	433	5.3

very high. In line with the results of research by Manurung *et al.* (2018) that the levels of C-organic peat soils are classified as very high, ranging between 34.59%-56.07%. According to Hardjowigeno (2003), the process of decomposition of peat soils under anaerobic conditions causes the accumulation of layers of organic matter, which contribute to the C-organic content of the soil.

The depth of the peat at the study site ranged from 15 m-370 m with an average depth of 140.3 m. Criteria for the depth of research between shallow to deep peat. According to Wahyunto *et al.*, (2005) dividing peat thickness into four classes, namely shallow (50-100cm), moderate (> 100-200 cm), deep (> 200-400cm), and very deep (> 400cm). Based on its depth, the soil at the study site is divided into 4 types, namely depth of 15-36 cm located at points 1-3 classified as mineral soil, 76-85 cm located at points 4-6 classified as shallow peat, 103-175 cm located at the point 7-12 classified as moderate peat, and 246-370 cm located at point 13-15 classified as deep peat.

Multiple regression analysis relates to the study of the dependence of a *dependent* variable on one or more *independent* variables in order to find out how much influence the *independent* variable has on the *dependent* variable. The results of multiple linear regression analysis between *independent* variables namely soil pH (X_1), cation exchange capacity (X_2), peat depth (X_3), soil C-organic content (X_4), dose N (X_5), dose P (X_6), K dose (X_7), and dolomite dose (X_8), as well as the *dependent* variable namely rice production presented in Table 2.

Based on the results of multiple linear regression tests presented in Table 2, the relationship between soil pH (X_1), cation exchange capacity (X_2), peat depth (X_3), and soil C-organic content (X_4) dose N (X_5), dose P (X_6), dose K (X_7), and dolomite (X_8) dose with rice production (Y) are described in the equation: $Y=60.1+0.679X_1-0.01X_2-0.0000005X_3-0.0058X_4+0.004X_5+0.008X_6+0.017X_7+0.004X_8$.

Partially, the influence of eight (8) independent variables on rice production seen that the coefficient regression soil pH (X_1) is 0.679 to 0.099 t value sig. This means that each increase in soil pH by 1 unit will increase rice yield by 679 kg/ha with no significant effect ($P > 0.05$). The value of the cation exchange capacity regression coefficient (X_2) is -0.01 with the value of t sig 0.538, which means that each increase of 1 me/100 cation exchange capacity will reduce rice yield by 10 kg/ha with no significant effect (non-significant). The regression coefficient value of peat depth (X_3) is -0.00005 with a t value of sig 0.981, which means that every 1 m increase in peat depth will reduce rice yield by 0, 000 05 kg/ha with no significant effect (non-significant). Value coefficient regression levels of soil organic C

(X_4) are -0.058 with a t value sig 0, 170, which means that every 1% increase in soil organic C will decrease the yield of rice by 58 kg/ha with no real influence (non- significant). Value coefficient regression levels of fertilizer N (X_7) were 0.017 with a value of t sig 0, 043, which means that every increase of 1 kg/ha dose of fertilizer N will shortly increase rice yield by 17 kg/ha with real influence. The value of the regression coefficient of fertilizer dosage level P (X_6) is 0.008, with a t value of 0.562. This means that every 1 kg/ha increase in the dose of P fertilizer will increase rice yield by 8 kg/ha with no significant effect (non-significant). Value coefficient regression levels of fertilizer K (X_5) are 0.004 with a t value sig 0, 685, which means that every increase of 1 kg/ha dose of fertilizer K will shortly increase rice yields by 4 kg/ha with no real influence (non- significant). The value of the regression coefficient of dolomite lime dosage level (X_8) is 0.004 with a t sig value of 0.18, which means that every 1 kg/ha increase in dolomite lime dose will increase rice yield by 4 kg/ha with real influence.

Table 2. Results of multiple linear regression tests relating the characteristics of soil and fertilization with rice production

No	Model	Unstandardized		Standardized	t	Sig.
		Coefficients		Coefficients		
		B	Std Error	Beta		
	(Constant)	60.1	20.562		-10.900	0.049*
1	pH	0.679	0.367	-0.159	-0.647	0.099
2	CEC	-0.010	0.015	-0.073	-0.025	0.538
3	Peat depth	-0.00005	0.002	-0.002	-10.530	0.981
4	C organic	-0.058	0.038	-0.107	0.423	0.170
5	N fertilizer	0.017	0.007	0.415	20.474	0.043*
6	P fertilizer	0.008	0.013	0.162	0.609	0.562
7	K fertilizer	0.004	0.009	0.091	0.423	0.685
8	Dolomite	0.004	0.001	0.372	30.78	0.018*

Note : * significant ($P \leq 0.05$)

In general, the results of the study showed that soil pH, cation exchange capacity, peat depth, and C-organic soil partially had no significant effect on rice yield. This is alleged because peat soils have soil pH, cation exchange capacity, peat depth, and C-organic soil are less compatible with rice so that their growth and production are not inhibited. In line with the statement (Salsi, 2011) that peatlands are marginal land for agriculture because of their low fertility, highly acidic nature, high cation exchange capacity, low base saturation, low K, Ca, Mg, P and microelements such as (Cu, Zn, Mn, B) are also low. Limited land of mineral land, causing the intensification of agriculture to peatlands, can not be avoided.

Agricultural development from peatlands faces obstacles, including high levels of organic acids. The bad influence of toxic organic acids can be

reduced by water management technology and the addition of materials that contain lots of polyvalent cations such as Fe, Al, Cu, and Zn (Ratmini, 2012). Krisnohadi (2011) added that organic compounds which are toxic and inhibit plant growth, thus the need for the addition of ameliorant material to overcome the problem of peat soil fertility.

Soil reaction (pH) is a chemical characteristic of soil that is very important to know because of its very broad implications for soil quality and land productivity (Bohn *et al.*, 2005). Soil reaction is closely related to nutrient solubility, plant tolerance, nutrient absorption, microorganism activity, and ion fixation in the soil. Soil reactions indicate acidity or alkalinity of the soil expressed by the pH value. The pH value indicates the amount of hydrogen ion concentration (H^+) in the soil. The general influence of pH on the crop is the availability of nutrients in the soil (Kimadi *et al.*, 2014). If the soil reacts sourly, some plants cannot grow well because of their reduced tolerance, whereas if the soil is too acidic, Al and Fe poisoning often occur, and fixation of anions such as phosphate and sulfate often occurs. Nutrient uptake and plant growth are generally less than optimal if the soil reacts sourly (Mengel & Kikrby, 2007). Riyandani's research results (2016) showed that peatlands in the Arut Selatan Subdistrict of West Waringin City District had land suitability with sufficient criteria following the limiting factor of soil pH values.

The results of multiple linear regression tests showed that each increase in soil pH by 1 unit would increase rice yield by 679 kg/ha. P Increased soil pH will cause increased more soil chemical properties so that the rice yield increased. In line with the statement of Djamhari (2009) that an increase in rice production on moist swampland can be achieved through an increase in soil pH. The results of Ardi *et al.* (2017) show that the increase in soil pH tends to be followed by the availability of macronutrients (N, P, K).

The cation exchange capacity (CEC) of soil can be defined as the ability of a colloidal soil to absorb and exchange cations. Cation exchange capacity is the number of cations that are absorbed or released from the surface of clay or humus colloids in milliequivalents per 100 g of soil or humus samples (Hakim *et al.*, 1986). Soils that have moderate to high organic matter, usually have a CEC that is relatively higher in soil than soils that are low in organic matter (Suriadikarta *et al.*, 2002). CEC value of land is very diverse and depends on the nature and characteristics of the land. The size of the CEC is influenced by soil reaction, texture or amount of clay, clay mineral species, organic matter, and liming or fertilizing (Hardjowigeno, 2003). The results of Waluyo & Djamhari's research (2011) show that peatlands in the Tanjung Elai area have land suitability with sufficient criteria following the

limiting factor of the CEC value.

The test results in the regression linear showed that every increase of 1 me/100 cation exchange capacity would reduce rice yield by 10 kg/ha. This is because peat soils have very high CEC values. On the other hand, the very high CEC value of land affects the disruption of rice growth, thereby reducing rice yield. Therefore the increase in CEC will be followed by a decrease in rice production. According to Noor (2001), the high value of this CEC was also accompanied by a low base saturation (KB) of 8%. Ca, Mg, K, and Na cations of the sorption complex are exchanged by H ions so that the IH will dominate the rice complex.

The test results from the regression linear showed that every increase of 1 m depth of the peat would lower the rice yield of 00.05 kg/ha. This is because the higher the depth of the peat, the lower the fertility of the peat due to the lower pH and retention of the soil. According to Najiyati *et al.* (2004), acidity peat tends to increase with depth of peat. The upper layers of shallow peat tend to have a higher pH than thick peat. Liming peat soils to increase pH is not very effective because of low peat Al levels. Sani (2011) goes on to say that shallow peat has a higher pH and N content than deep peat. The research result Maas *et al.* (2000) showed that peat moss has a land suitability criteria S_3 (corresponding conditional) by a factor delimiting peat thickness.

Also, the deeper the peat depth, the lower the level of peat maturity. Susandi *et al.* (2015) showed that peat maturity at a depth of 0-50 cm and 50-100 cm were classified as hemic peat with a fiber content of 41% and 61%, respectively, whereas the depth of 100-150 cm was classified as fibric peat (70.25% fiber content).

C-organic soil shows the level of organic matter contained in the soil. Peat soils usually have higher levels of organic C than mineral soils. C-organic levels indicate the level of peat maturity. Peat from the type of fibric level of C-organic levels will be higher than sapric and hemic (Soewardita, 2008).

The test results from linear regression show that every 1% increase in soil organic C will decrease the yield of rice by 58 kg/ha. This is because high levels of soil C-organic indicate that the decomposition process is not perfect. Also, the higher the C-organic level of peat soils will have an impact on the higher C/N ratio so that the availability of other nutrients is lower. Consequently, rice production will decrease. According to Mario (2002), the process of peat soil decomposition has not occurred perfectly because the dominant peat state is always saturated. These conditions cause peat soils to have a low fertility and pH level.

Based on the multiple linear regression equation, it shows that each increase of 1 kg/ha of N fertilizer dose will increase rice yield by 17 kg/ha with a

real effect. The increase in production due to K nutrients has an important role for plants. According to Sutedjo (2002) that the element K has a role to help root development so that it can increase nutrient uptake by plants, help in the formation of plant seeds to be more contained and dense, help the formation of proteins and carbohydrates, reduce grain loss so that the grain produced is high, and indirectly helps to activate the enzyme. Dobermann & Fairhurst (2000) add that nutrient K also has an important role for plants to improve photosynthesis, save water use, maintain turgor, form strong stems, act as an activator for various enzyme systems, and strengthen roots.

Plants lacking K show stunted growth. The root system of the plant is bad / obstructed. Plant stems become weak. Seeds and small fruit and have an abnormal shape. In conjunction with plant physiological processes, K deficiency can lead to the accumulation of soluble carbohydrates and reduced sugars, inhibited protein synthesis, inhibited utilization of respiratory substrate, phosphorylation oxidation velocity, and decreased photophosphorylation. So if it is concluded that K deficiency in plants is closely related to the metabolism of N and carbohydrates (Winarso, 2005).

Based on the multiple linear regression equation, it shows that every 1 kg/ha increase in the dose of P fertilizer will increase rice yield by 8 kg/ha with a real effect. In line with the results of the study Syamsiyah *et al.* (2009) that P fertilization has a very significant influence in increasing rice yields in the Kulon Progo beach sand fields.

The increase in rice productivity along with the increase in the dose of P fertilizer is since the P nutrient function directly influences seed formation. The higher the P uptake of plants, the better the formation of seeds. According to Rauf *et al.* (2000) the influence of the P element on rice plants is as follows: spur the formation of flowers, reduce abortion, support the development of fine roots and hair roots, strengthen the straw so that it does not easily fall and improve grain quality. The phosphorus deficiency causes stunted growth, the number of children k's slightly tapered and dark green leaves.

Based on the multiple linear regression equation, the N (X_3) fertilizer regression coefficient is 0.017, with a t value of 0.043. This means that every increase of 1 kg/ha dose of fertilizer K will increased rice yields by 4 kg/ha with real influence. The most important role of N elements in rice plants is as a compiler or as a basic ingredient of protein and the formation of chlorophyll because N has the function of making plant parts greener, contains many green grains and most importantly in the process of photosynthesis, accelerates the growth of plants that in this case increasing the height of plants and number

of seedlings, increasing the size of leaves and grain size and improving the quality of plants and grain, increasing levels of rice protein, increasing the amount of grain and the percentage of the amount of filled grain (Dobermann & Fairhurst, 2000).

According to Adil *et al.* (2005) that N functions as chlorophyll forming, which plays an important role in the process of photosynthesis. The higher the administration of N (up to its optimum limit), the amount of chlorophyll formed will increase. Nugroho (2015) added that the function of N, in addition to stimulating plant growth, also gives the leaves a green color. The darker green leaves on the plant maize showed higher nitrogen that is absorbed plant. The high uptake element N by the plant is expected will increase the weight of dried plants and also the results of the harvest.

Based on the multiple linear equation coefficient regression doses of dolomite (X_4) is 0.004 to 0.042 t value sig. This means that every 1 kg/ha increase of dolomite lime dose will increase rice yield by 4 kg/ha with a real effect. This is suspected because dolomite lime can increase soil pH so that the availability of nutrients increases. According to Makarim *et al.* (2007) states that the application of lime can neutralize the adverse effects of excess soluble Al High al will inhibit root growth so that it will affect nutrient absorption. The provision of dolomite will directly add Ca and Mg in the soil.

Nurhayati (2014) explains that lime affects the increase in soil pH. Soil with a pH of 6.5-7 causes microorganisms to be able to grow and develop properly. The availability of microorganisms can hydrolyze phospholipids in the presence of phosphate enzymes that can convert phosphorus compounds into plants that are proven to be able to provide a good effect on the growth of peanut plants. Following the opinion of Sarief (1986) which states that phosphorus plays a role in arranging the body of plants and several coenzymes that play a role in metabolic activity. With the increase in metabolic activity, the organic material that is formed is sufficiently available so that carbohydrates are produced and converted into plant organs.

CONCLUSION

Based on the results of the study, it can be concluded that the characteristics of the soil (pH soil, CEC, the depth of peat, C- organic), as well as the dosage of fertilizer K and P effect, is not noticeable to the results of rice. The provision of fertilizer N and lime dolomite effect on the real against the results of the rice. Each increment of 1 kg/ha dose of fertilizer N then will increase the result of rice amounted to 17 kg/ha. Each increment of 1 kg/ha dose of lime dolomite will improve the results of rice amounting to 4 kg/ha.

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