THE CORRELATION BETWEEN THE HEIGHTENING OF ACACIA MANGIUM AND GROWTH SITE FACTORS ON EX-AREAL OF TIN MINING
(HUBUNGAN ANTARA PENINGGI ACACIA MANGIUM DAN FAKTOR TEMPAT TUMBUH PADA AREAL BEKAS PERTAMBANGAN TIMAH)

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Abstract
Disturbance in forest ecosystem will have negative impact on forest itself and environment. In considering the negative impact resulting from mining activities, PT Timah is implementing “re-vegetation” with acacia mangium intensively on open lands as its ex-area of tin mining. The valuation showed the success of re-vegetation were the goodness of plants growth and plant site factors. This information was very important as standard to evaluate silviculture technique to re-vegetation strategy on the future.

Keywords: Acacia mangium, re-vegetative, site factors, ex-area of tin mining.

INTRODUCTION
The tropical forest is a stable ecosystem in a balance condition between the components of ecosystem. The disturbance on the forest ecosystem has a negative impact to the forest and its environment (Alberta Environmental Protection, 1995).

The mining activity of PT Timah, Ltd. will change the physical, chemical and biological environment such as the condition of soil, water quality, growth of vegetation and fauna habitat. The alteration of the environment must be managed to avoid the negative environment impact. One of the improvement activities to the disturbed ecosystem is the re-vegetation of the open area of ex-tin mining (Australian Mining Industry Council, 1990).

Seventy five percent of re-vegetation activity is conducted by the cultivation of *acacia mangium* in the ex-area of tin mining (PT Timah Indonesia, 1990). The growth of this plant influenced by three main factors, i.e.: genetic factor, growth site, and silviculture.

This study aim to get more information about the growth of *A. mangium* indicated by the correlation of between the factors influence the growth of plant (Majid et al., 1994)

MATERIALS AND METHODS
The materials used in this research were *A. mangium* stand of 2-6 years of age on ex-mining area PT Timah, Bangka Island-South Sumatra. The sample plots of 0,1 hectare in size (40 m length and 25 m width) was set on re-vegetation map. Sample plot total of observation is 1% re-vegetation area width for age 2 years = 460 hectare, 3 years = 320 hectare, 4 years = 200 hectare, 5 years = 210 hectare, and 6 years = 100 hectare.

Each plot 0,1 hectare was measured the high of plantations, altitude (m), the sands depth
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...stands, (m), slope of site and the sample of soil. Technique to get 1 kilograms soil sample by made profile on 0-50 cm and 50-100 cm mixing to be one, and then be analyzed the soil chemist characteristics, N (%), P (ppm), K (ppm), Ca (%), ratio C/N and pH. (Hakim, 1986)

The correlation of any factors of growth site to the heightening of A. mangium for all the age degree was state by equivalent Log Y = b0 + b1X1 +b2X2 +.....+bkXk + E (Husch, 1963). The methods which be used to choice the best regression with stepwise regression procedure.

RESULT AND DISCUSSION

The best regressions which state the correlation of age and some factors of site to the heightening of A. mangium was : Log Y = 1,3857 – 1,4576 X1 + 0,0618 X2 – 0,0537 X3 + 0,0049 X6 + 0,0061 X11.

Age

Age factor (X1) gives participate the biggest in mentioning the diversity of stands, the value 0,958. The negatives correlation showed 1/ age of plantation gradually lower (the age gradually older) so the stands gradually higher at the sure age.

N Contents

N contents (X2) have positive A. mangium stands, the value was 0,311. This means the increasing of N contents will be increasing the growth plantation. The mean of N contents in the research place was 16%.

P Contents

P contents (X3) have positive correlation 0,409 to stands. The means of P contents in the research place 0,27 ppm include very low category.

K Contents

K contents (X4) not be followed in this regressions because the value is too small 0,042. The means of K was 0,2 ppm.

Ca Contents

Ca contents (X5) not be followed in this regression because the value is too small 0,0242. The means of Ca was 1,55 ppm.

C Contents

C contents (X6) have positive correlation 0,559 to stand, it was mean the increasing the value of stands followed by increased of Carbon value. The C means 1,47%.

C/N Ratio

C/N ratio (X7) has negative correlation to stands – 0,111. C/N ratio not be followed in this equality because they e represented by C and N contains. The means C/N 10,36.

Table 1. The correlation of dependent variables and independent variables

<table>
<thead>
<tr>
<th></th>
<th>Age 1/X1</th>
<th>N X2</th>
<th>P X3</th>
<th>K X4</th>
<th>Ca X5</th>
<th>C X6</th>
<th>C/N X7</th>
<th>PH X8</th>
<th>Sand X9</th>
<th>Altitude X10</th>
<th>Slope X11</th>
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<tbody>
<tr>
<td>X2</td>
<td>0.285</td>
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<tr>
<td>X3</td>
<td>-0.446</td>
<td>0.116</td>
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<tr>
<td>X4</td>
<td>0.064</td>
<td>0.077</td>
<td>0.393</td>
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<td>X5</td>
<td>-0.030</td>
<td>-0.031</td>
<td>0.188</td>
<td>0.471</td>
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<td>X6</td>
<td>-0.579</td>
<td>0.225</td>
<td>0.466</td>
<td>0.233</td>
<td>0.294</td>
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<td>X7</td>
<td>0.080</td>
<td>-0.073</td>
<td>0.125</td>
<td>0.037</td>
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<td>0.211</td>
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<tr>
<td>X8</td>
<td>-0.198</td>
<td>0.135</td>
<td>0.179</td>
<td>-0.267</td>
<td>0.333</td>
<td>0.331</td>
<td>-0.037</td>
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<tr>
<td>X9</td>
<td>-0.101</td>
<td>0.147</td>
<td>0.121</td>
<td>-0.058</td>
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<td>-0.055</td>
<td>-0.147</td>
<td>-0.091</td>
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<td>X10</td>
<td>0.244</td>
<td>-0.045</td>
<td>-0.131</td>
<td>-0.276</td>
<td>-0.337</td>
<td>-0.333</td>
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<table>
<thead>
<tr>
<th>Age</th>
<th>N</th>
<th>P</th>
<th>K</th>
<th>Ca</th>
<th>C</th>
<th>C/N</th>
<th>PH</th>
<th>Sand</th>
<th>Altitude</th>
<th>Slope</th>
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</thead>
<tbody>
<tr>
<td>1/x1</td>
<td>X2</td>
<td>X3</td>
<td>X4</td>
<td>X5</td>
<td>X6</td>
<td>X7</td>
<td>X8</td>
<td>X9</td>
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<td>X11</td>
</tr>
<tr>
<td>X11</td>
<td>-0.043</td>
<td>0.050</td>
<td>0.089</td>
<td>-0.101</td>
<td>-0.171</td>
<td>-0.002</td>
<td>-0.071</td>
<td>-0.018</td>
<td>-0.001</td>
<td>0.338</td>
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<tr>
<td>Log Y</td>
<td>-0.958</td>
<td>0.331</td>
<td>0.409</td>
<td>-0.042</td>
<td>0.024</td>
<td>0.559</td>
<td>-0.111</td>
<td>0.195</td>
<td>-0.111</td>
<td>-0.027</td>
</tr>
</tbody>
</table>

Table 2. The Means Factors of Site and Soil Chemist Characteristics in the re-vegetation area

**Degree of Soil Acid (pH)***

Degrees of soil acid (pH) (X8) have positive correlation with stand 0.195. The correlation showed that the increasing of acidity of soil make decreasing the stands. The means of pH 4.5.

**Sand Depth***

Sand depth (X9) has negative correlation to stands -0.111. That correlation showed that the increasing of sand depth, the value of stands decreasing. The means of sand 5.99 meters.

**Altitude***

Altitudes (X10) have negative correlation to stands -0.027. The negative correlation showed that the increasing of place from the surface of sea make decreased the tree measurement. The means of altitude was 10.6 m.

**The Slope of Area***

The slopes of area (X11) have positive correlation with stands 0.093. This correlation showed that A. mangium grows better in the slope area. The means of slope area degree was 3.8%. The increasing of percentage of slope will make optimal drainage and aeration to plantation growth. (Thorne, 1990)

**CONCLUSION***

Management measure on the re-vegetation activity requires more information about the relationship between the factors influence the growth of plant. The factor of site exclude the age which has participate to A. mangium plantation growth on re-vegetation area were nitrogen, phosphor, carbon contents, and percentage of slope area with the best regression which state the correlation with site condition and the heightening of A. mangium was Log Y = 1,3857 + 1,4576 X1 + 0.0618X2 - 0.0537X3 + 0.0049X6 + 0.0061 X11.

**REFERENCES***


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