The Potential of Cultivating Fruit on Ex-Mined Soil in Indonesia

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Introduction

- Forest is food resources.
- Coal exploitation in forest area result in a substantial reduction and even the loss of vegetation such as fruit plants.
- Mine reclamation to restore forest’s function within poor soil condition.
- The purpose of the study is to review the potential of cultivating rambutan (Nephelium lappaceum L.) on ex-mined soil in comparison with the guideline on land suitability assessment provided by the Indonesian Ministry of Agriculture.

Methods

- The soil analysis in Binungan Site was taken in 2016 to test the suitability for N. lappaceum cultivation on ex-mining land.
- The soil samples were taken in 6 locations with different ages of mine reclamation.
- The samples were taken from: 0-30 cm and 30-60 cm depth
- Some parameters were tested: pH, organic carbon, cation exchange capacity (CEC), P2O5, and K2O.
- The soil quality was classified based on the guideline on land evaluation for agricultural commodities by the Indonesian Ministry of Agriculture.

Results

The soil analysis results: (Fig.2)

- very low value of pH (3.7-4.3);
- organic carbon of 0.31-1.34%;
- nitrogen total of 0.06-0.19%;
- cation exchange capacity (CEC) of 8.8-22.5 cmol/kg;
- P2O5 of 79-234 ppm;
- K2O of 80-214 ppm

Based on the guideline, this ex-mined soil is classified as "S2" : the soil has limiting factors that affect productivity and requires additional inputs by farmers.

Study Area

Coal mine reclamation area

- Site: Binungan
- Company: PT Berau Coal
- Province: East Kalimantan
- Country: Indonesia

- PT Berau Coal has planted rambutan (N. lappaceum) in Disposal P Block 5 in 2005 (Fig.1) with 1.786 ha (1,016 trees).
- There are 3 cultivars: Binjai, Rapiah, Garuda.
- It was first harvested in 2010.

Highlights

- Forest rehabilitation on ex-mine reclamation site has lower soil quality but is improving due to proper reclamation maintenance to be productive land for local community.
- Although all locations had extremely low of pH (<4.5), other tested chemical properties showed sufficient value as classified in “S2”.
- The intensification process (fertilization, proper cultivar selection, etc.) has to be conducted in order to improve the soil quality and fruit production.
- The soil also analyses shows an improvement on soil quality in mine reclamation area through years.

<table>
<thead>
<tr>
<th>No</th>
<th>Sample location</th>
<th>Year of mine reclamation</th>
<th>Soil depth (cm)</th>
<th>pH</th>
<th>C-organic (%)</th>
<th>N-total (%)</th>
<th>CEC</th>
<th>P2O5 (ppm)</th>
<th>K2O (ppm)</th>
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Land Evaluation for Agricultural Commodities Guidelines (for N. lappaceum L.)

Classification : S2

Fig.2. Comparison between soil analyses in 6 locations and Land Evaluation for Agricultural Commodities Guidelines for N. lappaceum L. (Ministry of Agriculture, Indonesia, 2011).

Fig.3. The local community together with the employees from coal company and its services companies harvest the fruit.