



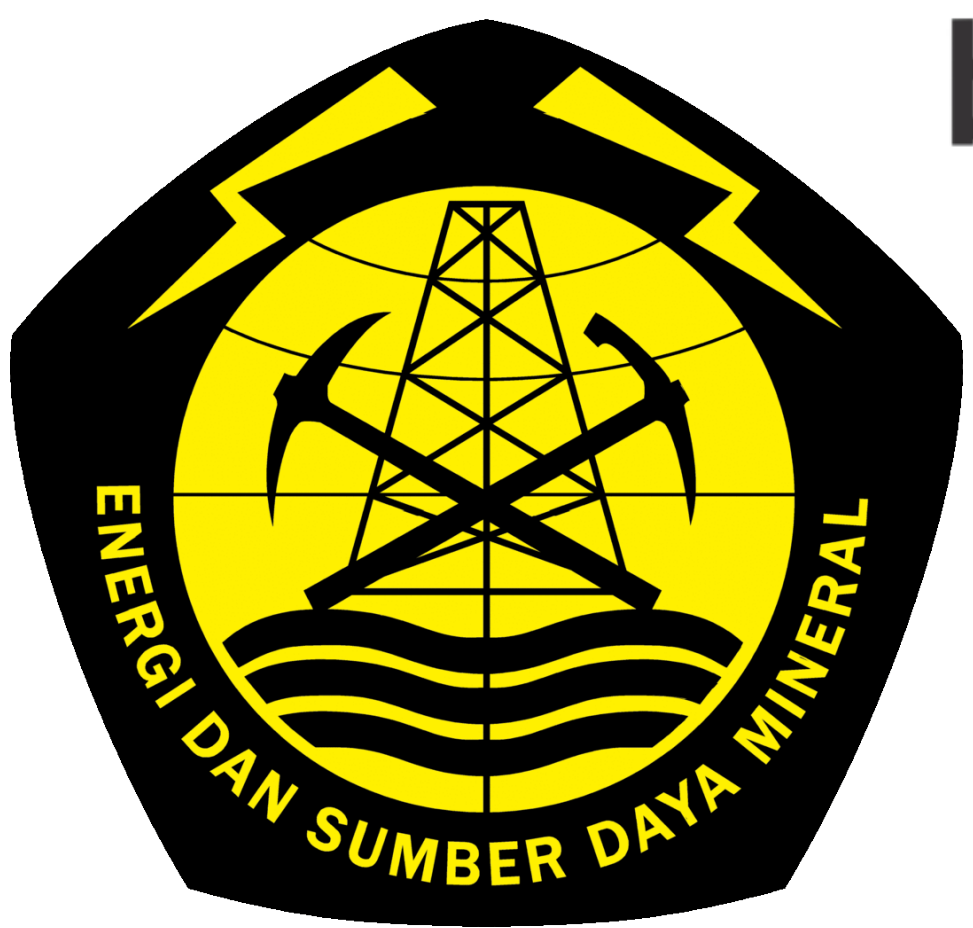
The Potential of Cultivating Fruit on Ex-Mined Soil in Indonesia

Tedi Yunanto¹, Farisatul Amanah², Doddy Herika³

¹Ministry of Energy and Mineral Resources, Bandung Polytechnic of Energy and Mining, Indonesia

²Ministry of Energy and Mineral Resources, Directorate General for Mineral and Coal, Indonesia

³PT Berau Coal, Post-mining Division, 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.



Fig.1. Disposal P Block 5 is an example of mine reclamation for *N. lappaceum* cultivation.

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, Rapih, 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.

No	Sample location	Year of mine reclamation	Soil depth (cm)	pH		C-organic (%)	N-total (%)	CEC	P ₂ O ₅	K ₂ O
				H ₂ O	KCl				HCl 25% (ppm)	HCl 25% (ppm)
1	IPD E	2015	0-30	4.1	3.7	0.63	0.07	15.2	13.4	11.1
			30-60	4.1	3.7	0.31	0.07	18	12.2	10.8
2	OPD E	2013	0-30	4.4	3.9	0.78	0.09	13.7	9.4	8.3
			30-60	4.3	4.2	0.55	0.09	22.5	7.9	8
3	IPD C6	2012	0-30	4.1	3.9	2.29	0.13	17.3	22.4	21.4
			30-60	4	3.7	1.34	0.1	12	13.9	18.3
4	OPD 4K	2010	0-30	4.4	3.9	1.1	0.09	10.4	23.4	21.9
			30-60	4.2	3.8	0.31	0.06	12.4	21.7	20.7
5	IPD D2 Ex	2008	0-30	3.9	3.7	3.52	0.19	15.4	14.6	14
			30-60	3.8	3.6	1.56	0.1	16.9	10.8	10.8
6	Disp G5	2006	0-30	4.2	3.9	1.24	0.12	9.2	23.4	14.2
			30-60	4.3	4	0.78	0.07	8.8	21.4	16
Land Evaluation for Agricultural Commodities Guidelines (for <i>N. lappaceum</i> L.)										
Classification : S2				4.5-5.0		0.8-1.2	0.1-0.2	5-16	15-20	10-20

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.