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

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Abstract

For centuries, forests have been food resources, particularly for local people. However, mining operations in forests result in a substantial reduction and even the loss of flora and fauna such as fruit plants. To restore the forest function as a food resource, fruit plants can be cultivated during mine reclamation. In terms of fruit production, fruit plants require macro and micro elements from the soil to achieve maximum yields and quality. Planting fruit plants in ex-mined areas proves to be challenging due to the poor soil condition such as low pH, inadequate organic matter and barrenness. This study, therefore, aims 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. The study also evaluates *N. lappaceum* production on Binungan Site, PT Berau Coal, East Kalimantan Province, Indonesia. The plantation of *N. lappaceum* requires 1,786 ha with 1,016 trees in three cultivars: Binjai, Rapih and Garuda. The plantation of *N. lappaceum* was opened in 2005 and first harvested in 2010. The crop yield records in 2020 were over 1,345 kg. The soil analysis results show that Binungan Site had a 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⁻¹; P₂O₅ of 79–234 ppm; and K₂O of 80–214 ppm. Based on the guideline, this ex-mined soil is classified as “S2” which means the soil is quite adequate for plantation although with limiting factors. Despite lower soil quality in the ex-mined area, *N. lappaceum* can still grow and produce fruit. To improve the soil quality and fruit production, the intensification process, such as fertilisation and proper cultivar plantation, has to be conducted. The evaluation reveals that the ex-mined area can be cultivated as a food and new economy source for the local community around the mining area.

Keywords: Ex-mined soil, food source, fruit production, mine reclamation, soil suitability