

ABSTRACT

Soil fertility is an important factor influencing rice productivity and sustainable paddy field management, while differences in environmental conditions between lowland and highland areas may affect soil chemical properties and fertility status. This study aimed to evaluate the soil fertility status of paddy fields in the lowland area of Peudada District, Bireuen Regency, and the highland area of Pegasing District, Central Aceh Regency. The study was conducted from February to May 2026 using a descriptive survey method. Soil samples were collected from six villages representing high, medium, and low productivity levels in each area. The results showed that CEC values in the lowland paddy fields of Peudada ranged from 11.63 to 34.72 me/100g (low to high), while in the highland soils of Pegasing they ranged from 16.48 to 39.06 me/100g (low to high). Base saturation values were consistently very low at both locations, ranging from 4.06 to 14.52% in the lowlands and from 4.12 to 7.00% in the highlands. Total P_2O_5 content fell in the medium category in the lowlands (28.44–35.57 mg/100g) and in the medium to high category in the highlands (29.87–49.74 mg/100g). Total K_2O content was high in the lowlands (45.16–56.49 mg/100g) and high to very high in the highlands (47.43–79.00 mg/100g). Organic carbon content varied from very low to medium in the lowlands (0.88–2.26%) and from low to very high in the highlands (1.10–5.47%). Nearly all paddy field samples at both locations were classified as having low fertility status, with the exception of one sample from Suka Damai Village (depth 20–40 cm) in Pegasing, which was classified as medium. This was primarily due to the very low base saturation values despite moderate to high levels of other fertility parameters.

Keywords: highland, lowland, paddy fields, productivity, soil chemical characteristics.