ABSTRACT

The physicochemical properties of soil are key indicators that determine soil quality, health, and fertility in supporting the agricultural system. This study aims to identify the physicochemical properties of soil in the Wih Balek Sub-Watershed, Central Aceh Regency, Aceh Province. The study was conducted from October 2025 to March 2026 using a survey method, with soil sampling based on 12 land use map units (LMU) obtained from map overlays (land use maps, soil type maps, and slope maps). Laboratory analyses included physical properties such as texture, bulk density, and permeability, as well as chemical properties including soil pH, organic carbon, and cation exchange capacity (CEC). The results showed that the soils at the study site were dominated by the sandy fraction, with the main texture class being sandy loam. Bulk density values ranged from 1,28 to 1,34 g/cm³ (classified as moderate to high), while soil permeability ranged from 1,57 to 4,37 cm/hour (classified as somewhat slow to moderate). Chemical analysis showed that soil pH ranged from 5,14 to 6,63, falling within the acidic to neutral range. The soil's organic carbon content ranges from 0.74–5.38% (classified as very low to very high), while the cation exchange capacity (CEC) ranges from 10,15–30,60 me/100 g (classified as low to high).

Keywords: CEC, land degradation, permeability, soil fertility, soil texture