

ABSTRACT

The Wih Balek Sub-Watershed, part of the Krueng Peusangan Watershed in Central Aceh Regency, plays an important role in maintaining hydrological functions, supporting agricultural productivity, and sustaining ecosystem services. However, inappropriate land use that exceeds land capability has accelerated land degradation, resulting in increased erosion risk, declining soil quality, and the expansion of critical land. Therefore, land capability evaluation is essential to provide a scientific basis for sustainable land use planning and effective soil and water conservation. This study aimed to determine the land capability classes and identify the dominant limiting factors in the Wih Balek Sub-Watershed. The research was conducted from October 2025 to February 2026 using a field survey method. Land Mapping Units (LMUs) were delineated by overlaying soil type, slope, and land use maps. The evaluated parameters included slope, erosion susceptibility, erosion level, soil depth, soil texture, permeability, drainage, and gravel or rock content. The results showed that the study area was classified into four land capability classes: III, IV, VI, and VIII. Class III occurred in LMUs 6 and 9 and was mainly limited by slope and soil texture. Class IV was identified in LMUs 10, 11, and 12, with erosion susceptibility and slope as the dominant limiting factors. Class VI occurred in LMUs 1 and 3 due to steep slopes, while Class VIII covered LMUs 4, 5, 7, 8, 13, and 14, primarily limited by soil texture. Overall, slope was the dominant limiting factor. These findings provide essential information for determining appropriate land use and supporting sustainable soil and water conservation practices in the Wih Balek Sub-Watershed.

Keywords: erosion susceptibility, land use, LMUs, soil conservation.