

ABSTRACT

Reduced soil absorption can cause runoff in the Wih Balek Sub-watershed, Central Aceh Regency. This condition causes erosion, sedimentation, reduced groundwater reserves and decreased infiltration rates in the Wih Balek Sub-watershed, Central Aceh Regency. Increased land conversion, intensive agricultural activities, land degradation and vegetation cover cause changes in soil physical properties and infiltration rates in the Wih Balek Sub-watershed, Central Aceh Regency. The aim of the research is to determine the differences in infiltration rates in various land map units in the Wih Balek Sub-watershed, Central Aceh Regency. This study was conducted in the Wih Balek Sub-watershed, one of the Krueng Peusangan Sub-watersheds. This study was conducted from January to April 2026. Analysis of soil physical properties includes porosity, permeability, and bulk density. Infiltration rate measurements were carried out using a double ring infiltrometer. This study used a survey method consisting of (1) preparation stage, (2) main survey stage, (3) preliminary survey stage, (4) data analysis stage and presentation of results. The results of the study showed that the porosity, permeability, and bulk density values ranged from 48.08% to 55.49%, with poor to good criteria, 1.62 cm/hour to 4.25 cm/hour with currently to fast criteria, and 1.28 g/cm³ to 1.34 g/cm³ with moderate criteria. The results of the infiltration rate ranged from 5.08 cm/hour to 125.48 cm/hour with currently to fast criteria. The infiltration rate must be managed using appropriate soil and water conservation techniques.

Keywords: Hydrological balance, Land cover, Soil conservation, Water catchment area