

## Abstract

Infiltration rate is a fundamental parameter in understanding a wide range of soil functions. The determination of the infiltration rate in the field usually requires a lot of time. Horton's equation is a viable option when measuring ground infiltration rates or volumes since it provides a good fit to data. However it is cumbersome in practice since it contains three constants that must be evaluated experimentally. The study aimed at developing equations that can be used to predict infiltration rate in different land use types based on Horton equations. The in-situ measurements of infiltration rate of the soil were done by a double ring infiltrometer in the upper part of Njoro River catchment. Tests were carried out four times in four land use types that included grassland, natural forest land, deforested and fallow agricultural land from May to December 2017. The field collected infiltration data was used to determine the constants of Horton's equation. The models describing data in various land use types were developed through regression analysis. Horton function was adapted to develop new infiltration rate equations for natural, fallow agricultural land, grassland and deforested land respectively. The study recommends the models to be applied to the other similar land use types where tests were not conducted. The equations can also be used to check the accuracy and reliability of automated soil water movement systems at defined intervals.