

# Quantification and prediction of infiltration behaviour of Tropudults toposequence of humid forest zone of Nigeria

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## Abstract

Infiltration is the key to soil and water conservation. The ability of the soil to accept continuous heavy rainfall or irrigation depends on the infiltration behaviour of the soil. To effectively design and operate surface irrigation systems to meet the water need for crop production, the infiltration capacity of the soil must be accurately known and quantified. For instance one can from infiltration curve determine amount of water to irrigate with time. The determination of infiltration behaviour of a soil is by field point to point measurements using ring infiltrometer. This point to point measurement is laborious, tiresome, time consuming and could be a very serious problem and expensive where water is limited. Several researchers have called for a method to predict infiltration of water without actual point to point measurement. Arising from these several calls, infiltration runs along a 5 % Tropudults slope was carried out at 5 m interval down a 50 m slope using a Double ring infiltrometer. The data were fitted into Philip and Kiostiakov infiltration models. The non-linear least square fitting procedure was employed to determine the parameters of the infiltration models [sorptivity, hydraulic conductivity of Philip model, sorptivity and soil stability upon wetting of Kostiakov model]. The models were used in predicting the infiltration so as to determine which model is applicable to the tested soil and toposequence. Coefficient of variability was determined. Chi-square [Goodness of fit] was used to show whether disparities exist between measured and predicted infiltration. The study confirms high variability of water infiltration rates and concludes that Philip model is superior to Kostiakov model in predicting water infiltration into Tropudults of humid forest zone of Nigeria.