

Runoff mechanism assessment using SCS-CN method in the Upper Blue Nile Basin of Ethiopia: Anjeni Watershed.

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ABSTRACT:

Despite its wide use, the Soil Conservation Service runoff Curve Number (SCS-CN) equation is not trusted by many hydrologists due to its fitness gap to different areas. In the process of finding a simple method for estimating runoff contributing area within a watershed and assessing the runoff mechanisms, we have used the original concept of SCS-CN approach in a 113.4ha Anjeni Watershed in the headwaters of the Blue Nile Basin, Northern Ethiopian highland. Analysis was done at event, daily and weekly base on 10 years of hydrological data (1988-97) by classifying the rainfall seasons in to six based on the seasonal cumulative of effective rainfall (P_e). The initial abstraction (I_a) for event based is first calibrated and the calibrated value is used in runoff amount determination. For daily and weekly, it is computed by Thornthwaite-Mather water balance in replacement of the 20% of the potential storage (S). Effective rainfall (P_e) is the difference of total rainfall and I_a . The model performed more as the seasonal cumulative P_e is increased indicating that runoff responses occurred as the watershed saturated. The proportion of runoff contributing area (A_f) increased linearly until the cumulative P_e up to nearly 500mm and then the watershed reaches in equilibrium for addition increase of P_e , which is in line with the concept of partial source area hydrology.

Key words: Runoff, initial abstraction, SCS, partial source area.