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An approach to modelling canopy and litter interception in indigenous and commercial forest plantations in South Africa

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There is a gap in the knowledge of both canopy and litter interception in South African forest hydrology. Interception is typically considered to constitute only a small portion of the total evaporation and in some models is disregarded. Interception is a threshold process, as a certain amount of water is required before successive processes can take place. Therefore an error introduced in modelling interception, especially disregarding it, will automatically introduce errors in the calibration of subsequent models/processes. Field experiments to assess these processes, *viz*. canopy and litter interception were established for the three main commercial forestry genera in South Africa, namely, *Pinus, Acacia* and *Eucalyptus* which takes account of both "broadleaf" and "needle-leaf" trees. The study took place in the well known CSIR Two Streams research catchment, located in the Seven Oaks area, about 70km north-east of Pietermaritzburg in the KwaZulu-Natal Midlands. In this study, 4 year old *Eucalyptus grandis* and *Acacia mearnsii*, as well as 15 year old *Pinus patula* stands with Leaf Area Index (LAI) values of 2.7, 1.1, and 1.9 respectively were considered. For the importance of interception in South Africa to be more fully understood the study is being extended into an indigenous *Podocarpus falcatus* (Outeniqua Yellowwood) forest in Karkloof which has been classified as a southern mistbelt forest. In order to establish a baseline water-use by indigenous trees under natural conditions, canopy and litter interception studies are required to facilitate the evaluation of the likely impact on water resources associated with a change in land use. This takes into account different bioclimatic areas/zones, vegetation types and tree ages. Drawing on both field and laboratory data, models to represent these processes were developed using parameters that are easily attainable. The litter interception model is based on site and species specific drying curves and the canopy interception model is a simplified version of the Gash analytical interception model. It was found that canopy and litter interception can be as much as 45.1% and 12.8% respectively, and are therefore important hydrological processes. The models developed were able to represent the interception values well and provide a way forward for more representative water resources planning modelling.