



A rule-of-thumb approach to estimate annual deep percolation and runoff in irrigated landscapes at field to farm scales

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The rootzone of a field or farm in irrigated landscapes is the logical unit that can be managed or influenced by farmers, catchment managers and water authorities. Increasing scarcity, variability and expensive nature of water supplies necessitates better understanding of the rootzone water balance in irrigated landscapes. The major terms of the annual water balance in the rootzone include rainfall, irrigation, evapotranspiration, deep percolation below the rootzone and runoff. While information on annual rainfall, irrigation and evapotranspiration can often be readily obtained at field to farm scales, deep percolation and runoff are typically unavailable as their continuous measurement is difficult and/or uneconomical. Consequently, these terms are often calculated using models that are able to simulate the rootzone water balance. In this case study, we developed a rule-of-thumb approach to estimate annual deep percolation and runoff for the Barr Creek catchment in northern Victoria, Australia. Firstly, annual deep percolation and runoff were calculated at field to farm scales using an integrated SWAT-MODFLOW model calibrated against a comprehensive data set including drain flows and salinity, remotely sensed evapotranspiration and watertable levels. Secondly, a rule-of-thumb approach was developed to approximate annual deep percolation and runoff from readily available information on annual irrigation, rainfall, evapotranspiration, soils, watertable levels and landuse. This rule-of-thumb approach can be applied to continuously estimate deep percolation and runoff.