

**THE INFLUENCE OF RAINFALL REGIMES ON CATCHMENT YIELD:
IMPLICATIONS FOR DESIGN OF SMALL WATER-SUPPLY
CATCHMENTS IN SEMI-ARID WESTERN AUSTRALIA**

M. Hipsey (1), M. Menabde (1), M. Sivapalan (1)

(1) Centre for Water Research, University of Western Australia, Australia
hipsey@cwr.uwa.edu.au

We investigate how regional variation in storm intensity, storm duration and inter-storm period manifests in the runoff response of agricultural water-supply catchments. High-resolution rainfall data was analyzed for a network of rain gauges located across the semi-arid (200-500mm/yr) agricultural districts of southwest Western Australia. Monthly averages of storm intensity, storm duration and inter-storm period were plotted as a function of space and time. It was found that locations that had a high potential evaporation rate, on average, experienced more intense storms that lasted for shorter periods when compared to their less dry counterparts. In order to simulate rainfall data, these rainfall statistics were fitted with trigonometric functions whose parameters were related to climatic and geographic data. The function parameters were subsequently used as input to the random cascade rainfall model described by Robinson and Sivapalan (1997) which generates high-resolution rainfall data based on the above three statistics. Runoff from farmland and engineered catchments was simulated using a conceptual 'bucket' model, whose parameters were calibrated based on the linear rainfall-runoff relationships presented by Laing (1981). The coupled rainfall-runoff model was subsequently used to calculate the expected catchment yield for various catchment types under a range of climatic forcings that were representative of regional and annual variation across southwest Western Australia. The rainfall-runoff model has been developed as a catchment design tool that allows landholders and managers to design water-supply catchments that ensure dams retain sufficient water throughout dry years by predicting, for a given location and dam capacity, the catchment area required to yield an acceptable volume of runoff.