Rainfall and water resources in the Upper Murrumbidgee Catchment

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The Murrumbidgee River is one of the three most important rivers in Australia. Surprisingly, research in the upper Murrumbidgee Catchment is limited and hydrological behaviour of groundwater is still largely uncharacterised. Current groundwater monitoring is also inadequate. This study aims to investigate the variability of rainfall, streamflow, groundwater, water quality and their interrelationships in selected sub-catchments of the Upper Murrumbidgee River.

Rainfall, streamflow and groundwater elevation all had significant spatial and temporal variations in the Upper Murrumbidgee Catchment. Warm season rainfall trends differed markedly from cool season rainfall trend. It is predicted that the chance of experiencing drier winter in the south-eastern MDB will increase by 17% in 2080-2099. However, winter rainfall at Yass has remained unchanged from 1890s-2012.

Deep groundwater system in the Lower Yass Catchment was strongly correlated to cumulative rainfall over the preceding 36-42 months. Shallow unconfined groundwater system in the Orroral Catchment had the best correlation with rainfall summed over the previous 12 months. The groundwater contribution was estimated to account for over 40% of the streamflow in the Orroral River at the time of sampling. Groundwater is a very important contributor to maintain streamflow, especially in higher elevation catchments such as the Orrroal, Gudgenby, Upper Molonglo Queanbeyan and Cotter River Catchments. Groundwater extraction should be controlled carefully and monitoring should be improved dramatically.

Salts in the upper catchment mainly came from mineral weathering, most likely from plagioclase, limestone and dolomite weathering. The Lower Molonglo Water Quality Control Centre (LMWQCC) is the major source of salt in the Murrumbidgee downstream of the confluence with Molonglo. Ways of reducing salt output from the LMWQCC should be sought.