The Brigalow Catchment Study was established to determine the impact on hydrology, water quality, productivity and soil fertility when brigalow land is cleared for cropping or pasture. This paired catchment study commenced in 1965, when three catchments were selected in central Queensland, Australia, to represent the extensive brigalow bioregion of approximately 40 million hectares. Catchment hydrology was characterised during a 17-year calibration period (1965–81). In 1982, two of the three catchments were cleared, with one developed for cropping and the other sown to improved pasture. The third catchment was retained as an uncleared control.

Land development for either cropping or grazing has doubled runoff and increased peak runoff rates. Deep drainage increased dramatically during land development and significant amounts of soil chloride were leached. This continues to occur under cropping. Water quality data collected during the wettest recorded season showed that loads and event mean concentrations (EMCs) of sediment and nutrients were greater from cropping than virgin brigalow scrub, however loads and EMCs from grazed pasture were typically less than or comparable to that of virgin brigalow scrub. The persistence of herbicides in runoff water was variable, with glyphosate undetectable 31 days after application and atrazine still detectable 812 days after application.

Assessment of soil fertility shows cropping has resulted in a decline in soil organic carbon, total nitrogen and bicarbonate-extractable phosphorus. Grazing beef cattle on improved pasture however has maintained soil organic carbon and total nitrogen levels, but has shown a greater decline in bicarbonate-extractable phosphorus than cropping.