Stuart Collard
University of Southern Queensland
collard@usq.edu.au

Soil Organic matter is an effective indicator of soil resource condition that reflects functional traits such as aggregation, infiltration and microbial activity and plays a critical role in sustaining production and ecosystem services in agricultural landscapes. Agricultural practices typically reduce soil carbon levels through the action of soil disturbance and consequent mineralisation. In the Brigalow (Acacia harpophylla) landscape we studied, soil carbon levels in pellic vertisols were significantly lower in the agricultural matrix of cropping and grasslands than in remnant Brigalow vegetation. There was no detectable gradient of soil carbon across Brigalow/matrix boundaries. Uncultivated grasslands showed signaificantly higher carbon levels than currently and previously cultivated grasslands, with regenerating grasslands showing no significant recovery of soil carbon over 15 years. The carbon management index (CMI) was used to combine the active and passive components of soil carbon to provide a sensitive indicator of the rate of change of carbon dynamics in response to changes in land management at local-scales. A landscape CMI (CMIL) was developed, by aggregating soil carbon data using GIS-derived spatial data. the landscape CMI is proposed as a potentially useful tool for modelling soil carbon dynamics and ecosystem function in agro-ecosystems at a range of spatial scales.