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Soil carbon and landscape function: grazing friend or foe?

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Abstract

The majority of Australian grazing lands have been degraded since European settlement, resulting in loss of soil carbon and reduced capacity to provide ecosystem services, from primary productivity and climate moderation to social and aesthetic values. Land degradation has also reduced resilience, making grazing land more vulnerable and less able to adapt to the impacts of climate change. With an already variable climate, much of the country is projected to become hotter and drier, with less rainfall, higher temperatures and higher evapotranspiration likely to shift some currently arable land into rangelands.

Ceasing degradation, restoring degraded land and building soil carbon levels offers multiple co-benefits – increasing primary productivity and water use efficiency while potentially providing a climate change mitigation option and improving adaptive capacity. While inappropriate grazing has contributed to historical loss of soil carbon, there is strong anecdotal evidence that innovative grazing management can regenerate degraded land and build soil carbon. However, little research has been done and results are often contradictory.

This paper presents the preliminary results of a grazing study in south-eastern Australia comparing continuous grazing and rotational grazing using high stocking density, short stocking periods and long rest periods. Preliminary results show differences in pasture composition and response to rainfall between stocking methods, with higher total carbon and total nitrogen under rotational than continuous grazing to 65cm other than in the surface soil where continuous grazing is higher.