



Top soil pools of C, N and plant nutrients in the Voëlvlei area, Western Cape, South Africa, following 45 years of Renosterveld restoration

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In the Western Cape region of South Africa, the intensification of agricultural land-use has caused a significant loss of the natural Renosterveld vegetation over the last 100 years. Renosterveld (*Elytropappus Rhinocertis*, “Renosterbos”) of the Western Cape region forms part of the endemic Fynbos biome located in the South African Cape region. Only 15% of its original distribution remains occurring in fragments across the landscape. The conversion of Renosterveld to agricultural areas (predominately wheat land) causes chemical and physical forms of soil degradation, such as reduced storage of soil organic carbon (SOC), diminished aggregate stability and disrupted nutrient cycles.

In this study, the effects of a 45-year-long Renosterveld restoration on abandoned farmland were tested with regard to the status of top soil (25 soil depth) C and N, plant nutrients and soil respiration. These results were compared to a wheat field under recent agricultural use. Our soil inventory exhibited a significant increase of SOC storage to 70.9 t ha⁻¹ (+160%) under Renosterveld vegetation compared to 27.1 t ha⁻¹ under wheat. Soil N pools under Renosterveld increased as well to 4.15 t ha⁻¹ (+ 36%) compared to 3.05 t ha⁻¹. With regard to plant nutrients (P, K, Ca, Mg, Fe, Mn, Zn, Cu, Na), the restoration with Renosterveld significantly enhanced the top soil pools of manganese, while due to fertilizer application pools of P, K, Mg, Fe, Mn, Cu and Na were significantly higher at the farm site. For calcium, zinc and soil respiration no differences between the two land-use forms became notable.