

Managing soil organic matter

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Significant progress has been made in understanding the dynamics and turnover of soil organic, its interactions with organisms and the contributions it makes to ecosystem functions, such as maintenance of soil fertility and structural stability, contributions to food security and wider environmental services. One conclusion is that there are few if any circumstances where the soil organic matter content can be too great, and from this it follows that rational management of the soil should include steps to conserve the soil organic matter present and to increase its concentration where possible. Indeed, the latter has been captured in the four per mil (per year) initiative to address food security and climate change challenges. There is however a conundrum: The very properties of soil organic matter which have agricultural and environmental benefits rely on the soil organic matter not being static and it turning over with the organic matter lost by decomposition being replaced by new inputs. The management options to retain or build soil organic matter whilst maintaining other functions of the land are however limited and much of the evidence suggests that it is easier to lose soil organic matter than it is to gain it. Several potential approaches have been proposed involving for example return of residues, manipulation of the decomposition processes, altering tillage practise, and addition of organic materials and stabilisation. There is some merit in all these processes, but they may come with additional costs or loss of income, some of which can be off-set against long-term sustainability. The possibility of payment for carbon storage in soil organic matter and carbon trading may seem an attractive route forward, but accounting for changes in soil carbon content is devilled by difficulties in assessing changes in soil organic matter content - it is the common problem of detecting the difference between two large and inaccurate estimates or the enigma of the weight of the ship's cat.