



## Carbon sink activity of managed grasslands

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In agriculture, a large proportion of GHG emission saving potential may be achieved by means of soil C sequestration. Recent demonstrations of carbon sink activities however, often questioned the existence of C storing grasslands, as uncertainty surrounding estimates are often larger than the sink itself. Besides climate, key components of the carbon sink activity in grasslands are type and intensity of management practices.

Here, we analysed long term data on C flux and soil organic carbon stocks for two long term (>13yrs) national observation sites in France (SOERE-ACBB). These sites comprise a number of grassland fields and managements options (i.e. permanent, sowing, grazing, mowing, and fertilization) offering an opportunity to study carbon offsets (i.e. compensation of CH<sub>4</sub> and N<sub>2</sub>O emissions), climatic-management interactions and trade-offs concerning ecosystem services (e.g. production). Furthermore, for some grassland fields, the carbon sink activity was compared using two methods; repeated soil inventory and estimation of the ecosystem C budget by continuous measurement of CO<sub>2</sub> exchange (i.e. eddy covariance) in combination with quantification of other C imports and exports, necessary to estimate net C storage.

In general grasslands, were a potential sink of C (i.e. net ecosystem exchange, NEE), where grazed sites had lower NEE compared the cut site. However, when it comes to net C storage (NCS), mowing reduced markedly potential sink leading to very low NCS compared to grazed sites. Including non-CO<sub>2</sub> fluxes (CH<sub>4</sub> and N<sub>2</sub>O emission) in the budget, revealed that GHG emissions were offset by C sink activity.