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Importance of non CO_2 fluxes for agricultural ecosystems - understanding the mechanisms and drivers

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In agriculture, a large proportion (about 89%) of greenhouse gas (GHG) emission saving potential may be achieved by means of soil C sequestration. Not surprising that exchange of carbon dioxide (CO_2) has been a main research objective during last decades. In spite of this, in agricultural ecosytems (i.e. grassland and croplands) a large proportion of total emissions (about 18% in CO_2e worldwide) are linked to non CO_2 fluxes (about 50% N2O, 40% CH4 in contraste to 10%CO_2).
Those emissions are however, diffuse, for example N2O, is emitted on almost all cultivated land, and all humid grasslands emit CH4 related to watertable. However, those emissions can vary largely from one site to another or from one farming system to another, while some studies even report a fixation of CH4 and N2O by grass- and croplands, not to mention the impacts of climate change on fluxes.
Finally, given the large number of findings, along with their significant diversity, complicates both estimation of these emissions and the mechanism that the public authorities could implement to encourage their reduction. To determine effective mitigation options, a better knowledge on the drivers of CH4/N2O as well as their temporal and spatial variability are of particular interest.
At present, more information is needed on i) the impact of agricultural practices and the contribution of CH4 and N2O to the GHG budgets within contrasting systems, ii) differences among climate regions and climate impacts, and iii) impact of managing soil microbial functioning (through plant diverstiy, litter inputs, etc). This presentation will review recent studies to highlight some new findings on the mentioned topics.