

## Liming of grasslands is a common agronomic practice but what are the implications of supporting this activity for climate regulation and grassland productivity?

**Objective:** To evaluate the impacts of liming on soil pH, biomass production, and net greenhouse gas (GHG) emissions in European grasslands.

**Methodology:** The research focused on the effects of liming on soil pH, grassland biomass production, and net GHG emissions, with specific attention to methane (CH<sub>4</sub>), nitrous oxide (NO<sub>2</sub>) and net carbon dioxide (CO<sub>2</sub>). A total of 12,468 papers were screened, and data from 55 papers were analysed. Data on soil pH and biomass production were analysed using paired tests with random effects. Limited data availability necessitated descriptive summaries for soil organic carbon, N<sub>2</sub>O, CH<sub>4</sub>, and CO<sub>2</sub> emissions.

### Key Findings:

The review supports the positive impacts of liming on soil pH optimisation, enhanced biomass production, and biodiversity in European grasslands.

- Optimisation of Soil pH and Reduction of Acidity—Liming grasslands proved effective in optimising soil pH and significantly reducing soil acidity.
- Enhanced Biomass Production and Biodiversity—Liming contributed to increased grass productivity, improving fertiliser nitrogen use efficiency and promoting plant species richness.
- Mixed Impacts on GHG Emissions—Liming either reduced or had no significant impact on N<sub>2</sub>O and CH<sub>4</sub> emissions. However, liming increased net CO<sub>2</sub> emissions.
- Minimal Net GHG Impact—Despite the rise in CO<sub>2</sub> emissions, the overall impact on net GHG emissions was minimal, reflecting reductions in N<sub>2</sub>O and CH<sub>4</sub> emissions.

### Policy Implications:

- There is a significant knowledge gap regarding the effects of liming on net GHG emissions, necessitating further research.
- The existing evidence strongly supports the regular liming of European grasslands on acid soils within the context of specific soils, climate and management practices.
- Adoption of sustainable liming practices to optimise soil conditions, biomass production and nutrient use efficiency should be encouraged.

**Key Reference:** Abdalla et al., (2022). Does liming grasslands increase biomass production without causing negative impacts on net greenhouse gas emissions? *Grassland at the heart of circular and sustainable food systems*, 518.