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GREEN WORLD RESEARCH

MITERRA-DSS: a decision support system to mitigate emissions of CO_2, CH_4 and N_2O from agriculture

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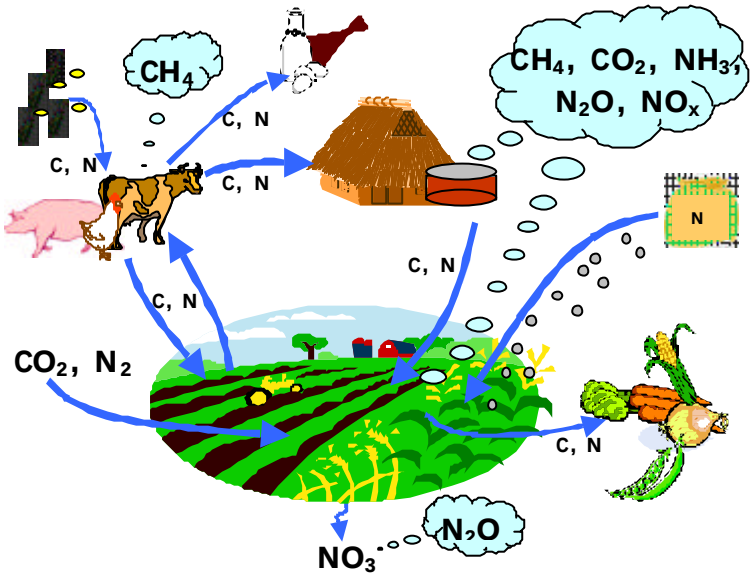
Introduction

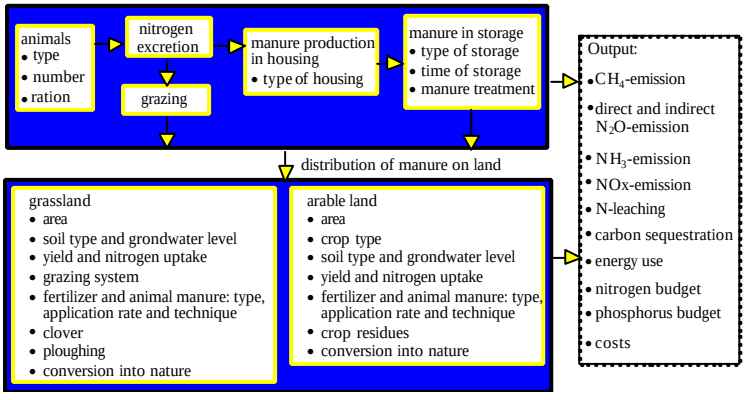
Agriculture in the Netherlands is a large N_2O and CH_4 source. Measures to decrease N_2O and CH_4 emissions have been identified, but the potentials are uncertain. A decision support system was developed to quantify the effects of mitigation strategies on greenhouse gas emissions, NH_3 and NO_x emissions and N leaching.



Greenhouse gas emissions and N and C flows in agriculture

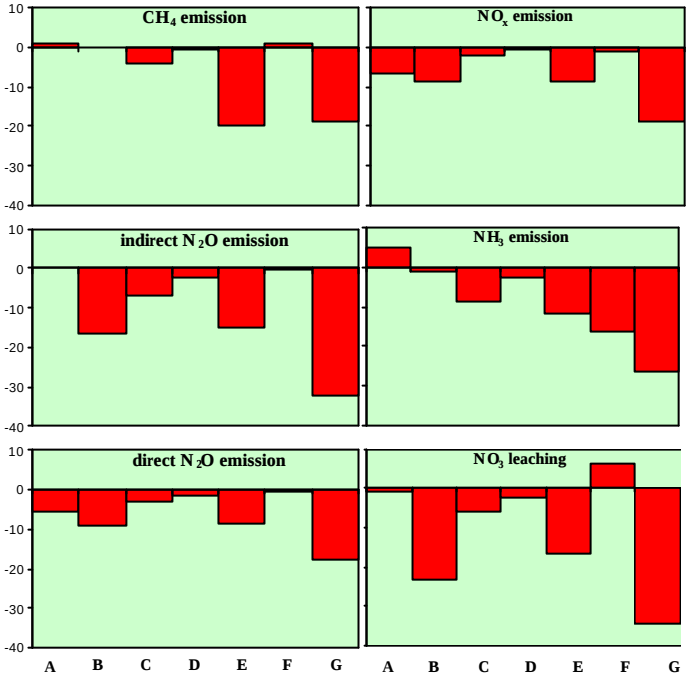
MITERRA-DSS

MITERRA-DSS calculates C and N emissions from animals, animal housing, manure, and agricultural land, using activity data and emission factors. Mitigation measures can be split into technological measures (e.g. fertilizer type, manure treatment), system innovations (e.g. grazing system, crop rotation) and structural measures (e.g. extensification, organic farming).



Set-up of MITERRA-DSS

Results



Change in emission in % in comparison to the year 2000 for several measures:

A. restricted grazing
B. 25% less N fertilizer
C. 25% less pigs
D. 25% less poultry
E. 25% less cattle
F. housings with low NH_3 emission
G. combination of measures A – F.

Conclusions

- there are clear potentials to decrease CH_4 and N_2O emissions, but some measures may increase NH_3 and NO_x emissions and N leaching.
- the sum of the single measures differs from the combined effect, indicating interactions between the measures.
- MITERRA-DSS can used as a tool for scientists and policy makers to optimize and integrate strategies for mitigation of greenhouse gases from agriculture, taking into account agricultural, economical and environmental constraints.

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