

## **A DECISION SUPPORT SYSTEM FOR THE INTEGRATED EVALUATION OF AGRICULTURAL MANAGEMENT ON ENVIRONMENTAL QUALITY**

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Excess nitrogen inputs by animal manure and fertilizer in the Netherlands do cause various effects, such as (i) decreased plant species diversity of terrestrial ecosystems by eutrophication and acidification (elevated N deposition), (ii) decreased water quality and species diversity of aquatic ecosystems and eutrophication of coastal systems (mainly by runoff of N), (iii) health impacts in terms of high NO<sub>3</sub> concentrations in drinking water (NO<sub>3</sub> leaching to groundwater) and (iv) climate change (N<sub>2</sub>O emissions). Apart from N emissions, excessive manure inputs also cause emissions of other greenhouse gases, mainly methane (CH<sub>4</sub>) and accumulation and/or elevated leaching of phosphate, base cations and metals to ground water and surface water. To gain insight in all environmental impacts of excessive manure application, an integrated model IMITATOR, was further developed by including all above mentioned impacts. This includes the assessment of all relevant N fluxes, methane and CO<sub>2</sub> emissions from animal housing systems, agricultural land and drained peat lands and leaching and runoff of nutrients to ground water and surface water. This presentation provides an overview of the integrated model system and a demonstration how the model can be used for the evaluation of mitigation measures in terms of emissions of nitrogen compounds and green house gases to air, ground water and surface water. The mitigation measures include both improved farming practices and structural changes in agriculture.