A DYNAMIC MODEL TO DEVELOP THE DIAGNOSIS OF N LOSSES AT ROTATION SCALE, BY THE STAKEHOLDERS

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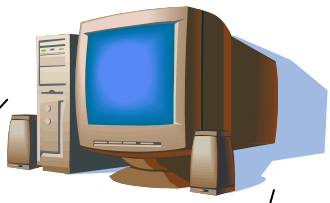


Objectives

• of the project Azosystem: **Decision Support System** currently developed in order to help widespreading the assessment and **diagnosis of N losses in agricultural systems**, at rotation scale. DSS **dedicated to environment stakeholders and agricultural advisers**
• of the poster: to present how scientific knowledge and users' knowledge were combined into this decision support system and the results of the choices made during the design of the software

Approach

• Survey → specifications ➔ **different prototypes** of DSS interfaces proposed and discussed **between the designers**, and **proposed to a panel of potential users** - *collaboration with an ergonomist to organize experimental design*
• Conception of the dynamic N model:
exhaustive **bibliographical analysis** (Cannavo et al, 2008) → negotiation between modellers
➔ decision to **integrate existing sub models and to adapt them to requirements**

Description of the cropping systems in their context, with user data and default regional database

Notes helping the users to describe the cropping systems, soil and climate.

Summarised description of the cropping system, enabling to copy, paste and modify them to consider different situations.

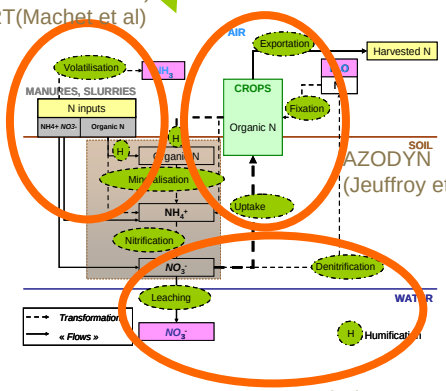
Scheme representing the cropping system being described, with every cropping operations

Input calculation for the simulator

e.g. Pedotransfer functions

Simulation of N fluxes a the rotation scale

Volt'air (Genermont et al)
AZOFERT(Machet et al)



AZODYN (Jeuffroy et al)

STICS (Brisson, Mary et al), NOE (Henault et al)

At the moment, the graphical interface has been implemented, and the N model composing the simulator is being implemented. Some sub-models are still discussed and tested. A functional prototype of the software is expected at the end of 2009.

Scientific and technical challenges

• An interdisciplinary approach involving future DSS users

Taking account of knowledge and constraints of **researchers specialist of different area**: cropping systems, environmental pollution at regional scale, N dynamics, modellers, and computer scientists

Collaborating with social science researchers to better **take account of future user requirements and knowledge**

• A reliable model functioning with available data of users considered by modellers as "simple" inputs

Some submodels such as slurry mineralisation, volatilisation and denitrification **modules adapted to require more simple input data than existing formalisms**.
"adaptation" = finding statistical relationship instead of developing mechanistic equations, to better take account of local pedoclimatic conditions.

Necessary **to include the crop yield as an input** to better predict crop growth and N uptake, in order to precise soil mineral N at autumn and consequently N leaching (Makowski *et al.*). This requirement is being studied from the point of view of the computer scientists to **assess the technical feasibility of this formalism**.

References: Cannavo P. et al. (2008) Modeling N dynamics to assess environmental impacts of cropped soils. Advances in Agronomy, vol. 97:131-174 ; **Makowski et al.** Measuring the accuracy of agro-environmental indicators. Journal of Environmental Management, *in press*. ; **Parnaudeau V., et al.** (2007). A Sociological Approach to Determine the Advisers and Stakeholders Requirements for Nitrogen Management and Diagnosis Tools. 15th European N workshop, Lleida (Espagne) Mai 2007.

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