18. NDICEA

FAIRWAY partner: Koos Verloop (Wageningen University and Research, NL)

Brief description	
Nitrogen Dynamics In Crop rotations in Ecological Agriculture. The program NDICEA nitrogen planner presents an integrated assessment on the question of nitrogen availability for your crops. This is more than a simple nitrogen budgeting for each crop: crop demand on one side, and expected availability out of artificial fertilizers and manures, crop residues, green manures and soil on the other side.	
Contaminants covered (e.g. nitrate, pesticides etc.)	Nitrogen
Intended end users (e.g. farmer, water quality manager, policy maker)	Farmers and advisors
Level of expertise and/or training required	Low level of expertise or training required
Geographical resolution (e.g. field, catchment, national)	Field scale
Temporal resolution (e.g. daily, annual, long-term).	Daily
Real-time component (e.g. live weather data, soil moisture data feeds etc.)	Weather data: temperature, rainfall, evapotranspiration
Number and type of mitigation measures included	Nitrogen for arable farming and horticulture; soil organic matter
Platform (e.g. paper-based tool, phone app, bespoke software).	Bespoke software (in Dutch, English, Danish, Spanish, German)
Frequency of updates	Not reported
Cost/availability	Commercial software
Number of users or number of copies distributed/ downloaded/purchased	> 1000 downloads
Links to demo material and other relevant information (e.g. user guides).	www.ndicea.nl (In Dutch, English, Spanish)
Additional comments	In conversion towards a web-based version instead of PC-based version

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Input data required to run the DST	Country; region within the country (So far: NL 6 regions, ES 2 regions, UK 4 regions, DK 5 regions, D 8 regions (in Nordrhein-Westfalen) Field data: soil type topsoil and subsoil, organic matter content topsoil, pH topsoil, groundwater table Environmental data, daily-based: average temperature, rainfall, irrigation, evapotranspiration Historical (at least two years) and actual (this year) data on: Crops: sowing date, harvest date, yield. If available: N-P-K content, d.m. content Green manures / catch crops: sowing date, havest date, estimated d.m. production Artificial N fertilizers: type, quantity, date of application Organic fertilizers: type, quantity, date of application. If available: N-P-K, DM and OM content
Outputs (including links to water quality and economic or financial aspects)	Graph crop nitrogen uptake versus nitrogen availability Graph course soil inorganic nitrogen level (topsoil, subsoil) Graph cumulative nitrogen leaching for each crop / catchcrop Graph cumulative nitrogen denitrification from topsoil Graph course of topsoil pH Graph course of topsoil organic matter quantity Table mineral balance, average per year of the scenario in question.
Age/provenance of supporting data used to develop the DST	First model design 1987 Adaptations in both calculation methodology (for example root growth, temperature-driven start of crop-growth) and crop/manure input data 2000 - 2014 Last upgrade 2014, including introduction of N losses due to volatilization from artificial fertilizers
Country-specific calibration or data requirements (including restrictions on use)	The model has been validated for northwest-European climatic and soil conditions. Calibration, validation or model adaptation required for: - conditions with substantial snowfall / soil frost - conditions with a substantial shortage in the rainfall - evapotranspiration balance - soil conditions substantially different from northwest-European soils. At each site: calibration by means of a check between measured and simulated level of soil inorganic N could improve model performance. A calibration procedure is included in the model.
Details of validation and testing	None supplied
Date developed/released (or planned release date)	Early 2000
Author/developer names and affiliations	Van der Burgt (WUR/Louis Bolk)
Member state(s) where developed	NL
Member State(s) where currently used	NL
Key publication references	Burgt G.J.H.M. van der, Oomen G.J.M., Habets A.S.J. & Rossing W.A.H. (2006) : The NDICEA model, a tool to improve nitrogen use efficiency in cropping systems. Nutrient Cycling in Agroecosystems 74: 275-294. Burgt G.J.H.M. van der, Oomen G.J.M. & Rossing W.A.H. (2006): The NDICEA model as a learning tool: field experiences 2005. In Proceedings European Joint Organic Congress, 30-31 May 2006, Odense, Denmark, 236-237.

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Any other useful information (e.g. screenshots of DST input/outputs)