Nitrogen balance calculator

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Field nitrogen balance

Input of N in

+ mineral fertilisers
+ in manure (only inorganic/soluble N)
+ organic fertilisers

Output of N

- yield (N concentration)

Reference values?

When field nitrogen balance is low, average or high?

30.9.2021

How we determined reference values for nitrogen balance

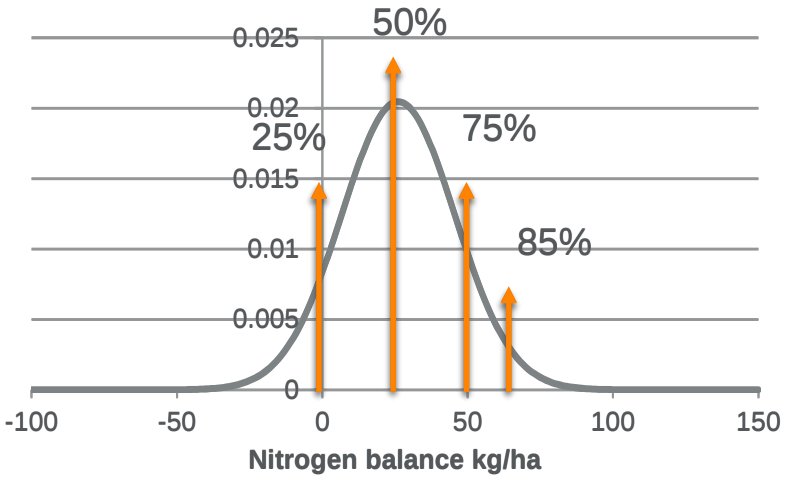
Available field notes in Finnish farms have been collected in joint projects

Thanks to: ProAgria, Syke, Finnish Food Authority, Raisio Agro, Teho-project, Hankkija, Sugar beet and Potato research centres

230 000 observations during 1988-2018

30.9.2021

Distributions for nitrogen balance



Distributions are based on:

crop, use of manure, growing season (=year), region, soil type (organic/mineral)

Years 2019-2021 are compared to most similar weather year in data

Calculator in Finnish

https://maatalousinfo.luke.fi/fi/laskurit/nitrogenbalance

http://urn.fi/URN:ISBN:978-952-380-051-9 (Manual in Finnish)

Reports to deal with the used data:

Turtola et al. 2017.

https://jukuri.luke.fi/handle/10024/538541 (in Finnish)

Salo et al. 2013. Nitrogen fertilizer rates, N balances, and related risk of N leaching in Finnish agriculture

https://jukuri.luke.fi/handle/10024/481096

Input

Region (municipality) and year

	Field	Soil type	Crop	Yield	moisture	Protein, %	Mineral N	Manure inorg. N
Valitse lohko	Lohkon nimi	Maalaji *	Kasvi *	Satotaso vuonna 2021 (kg/ha) *	Sadon kosteus (%)	Sadon valkuais-pitoisuus kuiva-aineesta (%)	Väkilannoitetyppi *	Lannan liukoinen typpi *
☐	minera	savi	ohra	1400	14,0	12,6	95	0

Output

Field Crop Nitrogen balance Balance compared Risk of losses Measures

Lohko	Kasvi	Lannoitteissa annettu liukoinen typpi – sadon mukana poistunut typpi = **typpitase** (kg/ha)	Typpitase suhteessa viiteryhmään	Typpitaseesta aiheutuva ympäristöriski	Ympäristöriskiä vähentäviä toimenpiteitä
minera	ohra	95 – 24 = **71**	Typpitase on hyvin suuri. Se on suurempi kuin 85 %:lla vertailuaineistosta.	Typpihuuhtouman riski on selvästi	Vesitalouden parantaminen, typpilannoituksen vähentäminen, viljelytoimien kriittinen tarkastelu, kerääjäkasvien viljely

High N balance, > 85%

Leaching risk increased

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Next steps

Calculator includes:

Tool to optimize nitrogen rate for spring cereals

- Based on price of fertilizer N and yield
- N response curve is estimated by N0 and yield with common N rate

Number of crops for N rate optimization to be increased

Calculator should be integrated in the computer programmes in use, where crop maangement and fertilization are planned and documented

The current version has an educational value, but it is not feasible to use as farm management tool

Thank you!

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