Reducing fertilizer level: what are the consequences on Irish diary farms?

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Introduction

- For pasture-based dairy production systems, identifying the appropriate yearly stocking rate based on farm grass growth is the key strategic decision driving the overall farm business.
- The European Green Deal has identified the requirement to reduce dependency on fertiliser in food production systems.
- This work looks at the consequences of a reduction in chemical N fertiliser application on Irish dairy farms

Material and Methods

The models used are the PBHDM in conjonction with the MoSt GG model

Simulations:

- Varying **stocking rate** (from 2 to 3 cows/ha, 0.25 unit changes)
- **Fertiliser nitrogen application** rates (from 0 - 300 kg N/ha, 50 kg/ha unit changes)
- **Soil type** (heavy (HS) and a free draining soil (FDS))
- **16 years of weather** data 2003-2018

Results

Average grass yield:

- 0 kg N: 9,436 kg DM/ha/yr
- 300 kg N: 14,996 kg DM/ha/yr

Extreme grass yield:

(250 kg N/ha/yr)

- 2018: 9,275 kg DM/ha/yr
- 2001: 15.363 kg DM/ha/yr

Soil type impact:

- HS grew more grass than FDS → less drought
- Grass intake was higher on FDS than HS
  - HS paddocks were often waterlogged preventing grazing
  - More silage was harvested and fed on HS
- Average response to N fertiliser application was similar on both soil types

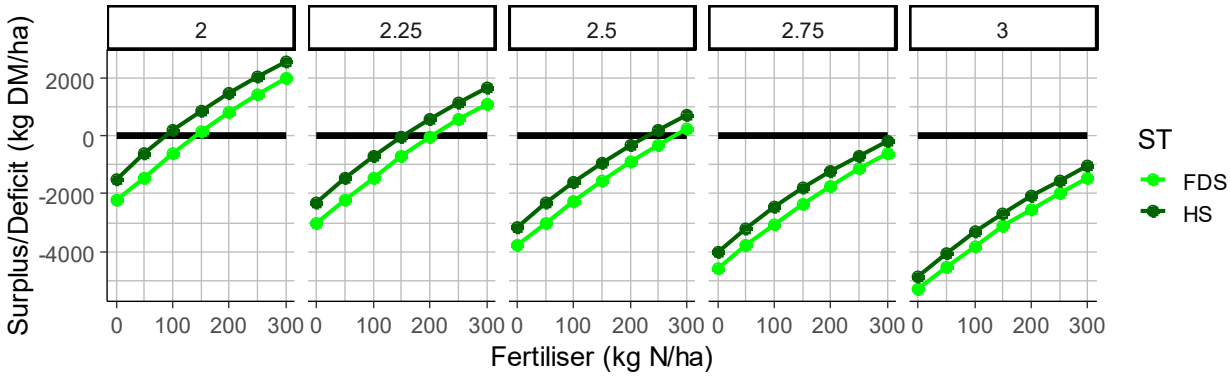

Figure 1: On farm surplus or deficit depending on soil type, stocking rate and fertiliser level.

Reduction of 50 kg/ha in chemical N fertiliser application per ha would lead to **a reduction in SR of 0.20 cow/ha** if no other action is taken.

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