



**STENON**

# Global issue of mis-harmonization of soil testing methods

Taking nitrogen as an example



## Overuse of fertilizers causes

- Soil and water pollution through nutrient leaching
- Alteration of biogeochemical cycles
- Autrophication of water bodies
- Greenhouse gas (GHGs) emissions.

*(ref: FAO)*

**Annually  
28 bn\$  
wasted**

Due to low efficiency within Fertilizer application

**56 bn\$**

**Nitrogenous-Fertilizer** market in 2021 (ref: Straits research)

**50%**

**is lost through** various pathways to the surrounding environment (ref: NIH)



# 38%

agricultural emissions come from the release of N<sub>2</sub>O (a potent GHG with a global warming potential 300 times higher than CO<sub>2</sub>) *(ref: FAO)*

# 1130 MtCO<sub>2</sub>

in 2018 N fertilizer supply chain was responsible for estimated emissions *(ref: Nature)*

# 91 bn\$

annual costs of emissions allowances triggered by N fertilizer supply chain only *(ref: ember-climate EU)*



Growers need N data to fertilize on the  
**right spot, at the right time in the right amount**



How can soil data be accessed today to drive **profitable, sustainable and efficient** decision making on inputs?

- 01.** Results way too late / or even non existent (*no laboratory infrastructure*)
- 02.** Poor resolution
- 03.** Results not in a workable format
- 04.** Farmer still needs agronomic advice

## Available Parameters

### Nutrients

- + Plant available N

### Microclimate

- + Light Radiation
- + Humidity
- + Air Pressure
- + Air Temperature

### Soil Health

- + SOC (Soil Organic Carbon)
- + SOM
- + Soil Moisture
- + Soil Temperature



## Web-Application

- + All data in one place
- + Browser based & device
- + Independent visualization of measurements
- + Device & User Management
- + Import of field boundaries
- + Export measurement results (Shapefile)

## Performance

- + Measurement results in < 30s
- + External accuracy certified technology
- + **10-25% improved N-efficiency**

STENON faced the issue that **Soil Testing Methodologies** are not harmonized globally which revealed the need for country-specific calibrations

**01.**

Plant available nitrogen data in the soil is not comparable across countries.

**02.**

Country-specific soil extraction, chemistry, concentrations, procedures for handling and analysis are mostly unique. *Different methods are even used within the same country* in some instances.

**03.**

Especially for nitrogen testing there is very little to no knowledge regarding how to transfer data derived from country-specific methods to other countries.





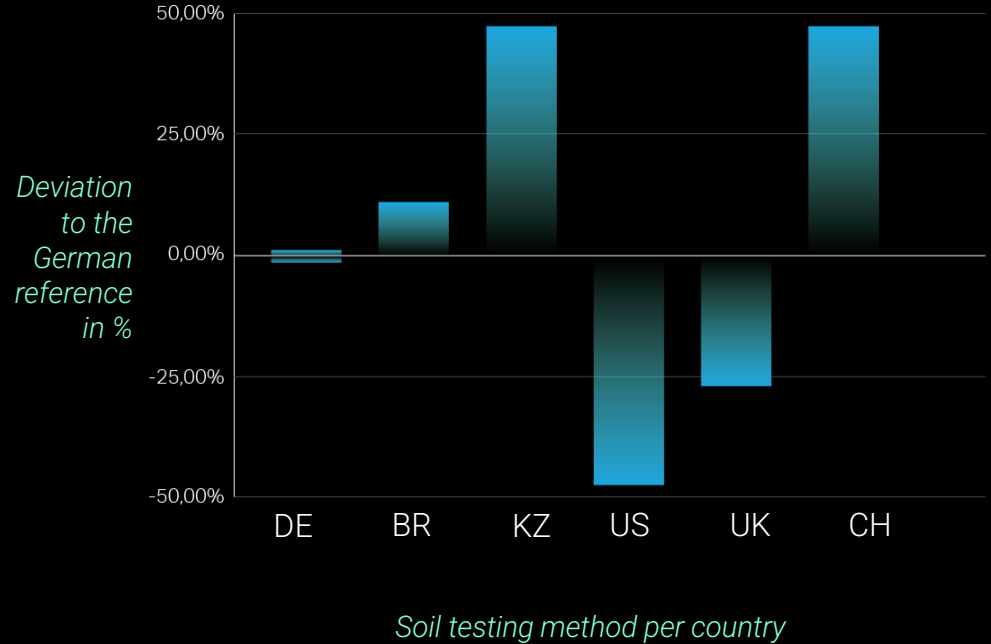
How can we solve the global problem of **over-fertilization and its resulting emissions and pollution** if there is no common method to even measure it?

**STENON** started an internal program to create a vast data set of actual laboratory soil data consisting of local and imported samples with the specific purpose of **HARMONIZING** data between laboratories and country-specific methods.

**Our findings:**

**1** Deviations are huge between country-specific methods

**2** Typically there is a non-linear correlation between methods



As of today, **Stenon** is able to convert soil testing methods from **more than 7 specific countries**

Let's harmonize to make **Nitrogen over-fertilization globally measurable.**





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