

From Scan to Recommendations

- two products with applications featuring the same technological principals



LIAB (Lab in a Box)



Scanner



AgroCares Scanner

- Instant, on-the-spot monitoring of nutrients in soil, feed and crops

- ✓ In the field or farm, real time
- ✓ Fast: 10 minutes procedure
- ✓ Monitoring during growing season/on the spot
- ✓ Near Infrared spectrometer (NIR sensor)
- ✓ multiple Apps for different purposes/countries
- ✓ Apps can be customised/white label
- ✓ Macro nutrients



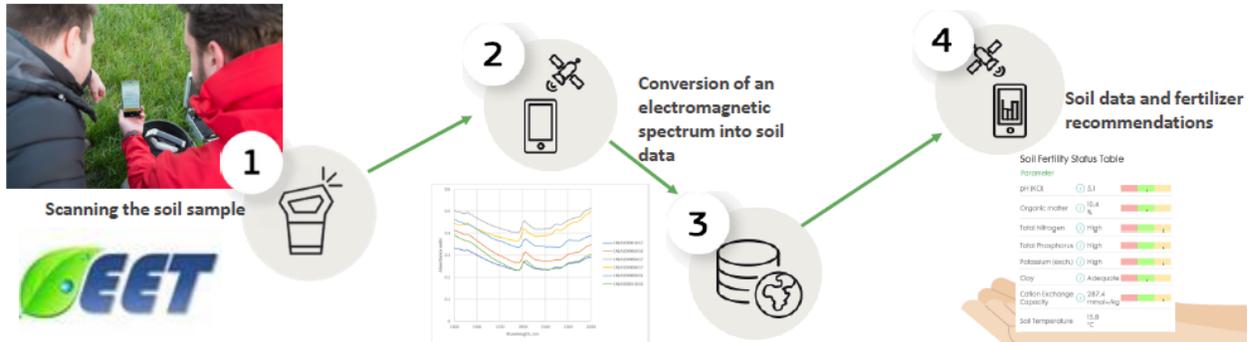
Principle of Agrocared Database

And what are prediction models?

Prediction models are used to convert sensor data into the required parameter (soil data).

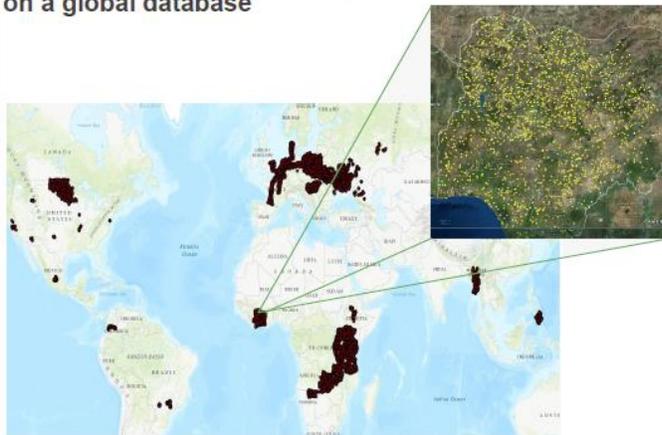
Spectral information is building the prediction models for each sensor (with individually optimized parameters, but all use the same algorithmic structure (Locally weighted learning (machine learning) – allows global model to produce localized predictions.

With every scan a new model is built (using 300 'neighbors') based on the best possible match, including fusion models.



Principle of Agrocared Database

Soil testing technology using sensor data based on a global database



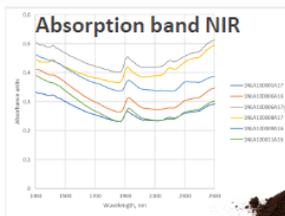
At the moment the global database contains 14000 samples. Every month there is a new update.

- Agrocared database is a collection of spectral data combining NIR, MIR, Xrf and wet chem data (analysis done in NL by the Golden Standard lab)
- database sample are based on a range of carefully selected samples from each country
- Selection criteria with the aim to cover maximum deviation of spectra (e.g. soil types, geography, land use, elevation, altitude, climate etc).

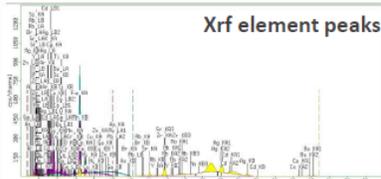


Sensor technology

Sensor technology requires calibration database and prediction models to convert spectral data into meaningful soil data!



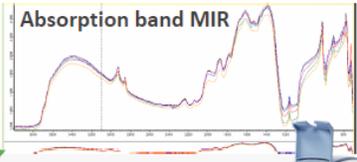
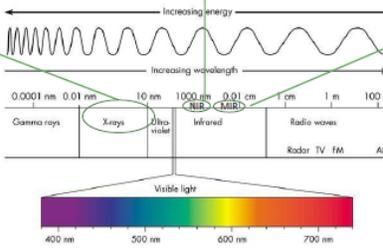
Other parameters determined indirectly by using chemometrics
Chemometrics -> advanced statistics to extract spectra information, by relating the measured sample to physical chemical components



- Xrf collects information at atomic level
- Analysis of elements from Sodium (Na;11) to Uranium (U;92)



- Near – and Mid Infrared energy vibrations caused by excitation by light
- Most active molecules are those containing C-H, N-H and O-H bonds – associated with organic matter, nitrogen and different mineral components.



From Scan to Recommendations

- Scanner measurement results

Soil Fertility Status Table

Parameter	Value	Status
pH (KCl)	5.1	Low
Organic matter	10.4 %	High
Total Nitrogen	High	High
Total Phosphorus	High	High
Potassium (exch.)	High	High
Clay	Adequate	Adequate
Cation Exchange Capacity	287.4 mmol+/kg	High
Soil Temperature	15.8 °C	Adequate



1. pH (KCl)
2. Organic Matter %
3. Total Nitrogen g/kg
4. Total Phosphorus g/kg
5. Potassium (exch.) mmol+/kg
6. Clay %
7. CEC mmol+/kg
8. Soil Temperature °C



From Scan to Recommendations

- Soil Status Report

BACK Report Detail

Soil Status

Parameter	Value	Indicator
pH (KCl)	adequate	
Organic Carbon	adequate	
Total Nitrogen	high	
Total Phosphorus	high	
Potassium (exch.)	high	
Cation Exchange Capacity	high	
Soil Temperature	18,0 °C	

Suitable Crop Types

Disclaimer

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BACK Report Detail

Fertilization and Management Advice

Crop : maize
Variety : maize
Class : plant_hole
Target Yield : 32000 kg

Before Planting

1000 kg agricultural lime
32000 kg compost or animal manure

At Planting

Alternative 1 - 2180 kg of - 17-17-17
Alternative 2 - 4000 kg of - 25-5-5-SS
Alternative 3 - 1880 kg of - MGP

Put the fertilizer at the bottom of the planting holes, put 10 centimeter of soil on top, then add the seed and cover the seed with soil.

6 weeks after

Alternative 1 - 1580 kg of - CAN
Alternative 2 - 920 kg of - urea
Alternative 3 - 2020 kg of - SA

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BACK Report Detail

Suitable Crop Types

Potatoes Beans Grains Vegetables

Your soil is suitable for growing potatoes, grains and beans. Growing vegetables will be more difficult.

Disclaimer

The Analysis Report exclusively relates to the sample presented and examined by the Laboratory. Soil Cares gives no Warranty that the Analysis Report relates to the source or any part of the source of the sample. Please note that the recommendations given in the Analysis Report provide indicative rates, are only valid for the sample presented and based on parameters included in the request for analysis, such as crop type, field size, yield target and soil characteristics.

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From Scan to Recommendations



Measurement result

Soil Fertility Status Table

Parameter	Value	Indicator
pH (KCl)	5.1	
Organic matter	10,4 %	
Total Nitrogen	High	
Total Phosphorus	High	
Potassium (exch.)	High	
Clay	Adequate	
Cation Exchange Capacity	287,4 mmol+/kg	
Soil Temperature	15,8 °C	

Classification into classes

Low – fertilizer recommendations include crop nutrient requirements plus extra amount for soil maintenance (no overfertilization or pollution of the soil!)

Adequate – fertilizer is advised according to the crop nutrient requirements

High – no additional fertilizer is recommended except for crop requirement of N, to not overfertilize the soil and cause environmental pollution (replenishing fertilization)

