

FertilizationManager

field 3 arable

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Example report
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Analysis Investigation/ordernr: 700443/003709395 Date sampling: 01-11-2023 Date report: 14-11-2023

Results	Unit	Result	Target value	low	rath.low	good	rath.high	high
Chemical	Total N stock	kg N/ha	5810	5450 - 8170				
	C/N ratio		14	13 - 17				
	N-supplying capacity	kg N/ha	85	95 - 145				
	S-plant available	kg S/ha	19	20 - 30				
	Total S stock	kg S/ha	1435	1190 - 2215				
	C/S ratio		56	50 - 75				
	S-supplying capacity	kg S/ha	24	20 - 30				
	P-plant available	kg P/ha	4,3	6,0 - 10,0				
	P-soil stock	kg P/ha	395	510 - 655				
	K-plant available	kg K/ha	295	235 - 365				
Physical	K-soil stock	kg K/ha	495	450 - 755				
	Ca-plant available	kg Ca/ha	105	240 - 560				
	Ca-soil stock	kg Ca/ha	8535	7695 - 9790				
	Mg-plant available	kg Mg/ha	275	235 - 365				
	Mg-soil stock	kg Mg/ha	420	460 - 765				
	Na-plant available	kg Na/ha	120	50 - 100				
	Na-soil stock	kg Na/ha	92	62 - 103				
	Chloride	kg Cl/ha	67	43 - 63				
	Si-plant available	g Si/ha	26430	20030 - 86780				
	Fe-plant available	g Fe/ha	6880	8340 - 15020				
	Zn-plant available	g Zn/ha	1400	1670 - 2500				
	Mn-plant available	g Mn/ha	11950	19360 - 26700				
	Cu-plant available	g Cu/ha	70	135 - 215				
	Co-plant available	g Co/ha	20	15 - 25				
	B-plant available	g B/ha	605	535 - 735				
	Mo-plant available	g Mo/ha	< 10	330 - 16690				
	Se-plant available	g Se/ha	9,0	12 - 15				
	Acidity (pH)		5,2	5,7 - 6,3				
	C-organic	%	2,41					
	Organic matter	%	5,1					
	SOC/SOM ratio		0,47	0,45 - 0,55				
	Carbonate lime	%	0,2	2,0 - 3,0				
	Clay (<2 µm)	%	3					
	Silt (2-50 µm)	%	9					
	Sand (>50 µm)	%	83					
	Clay-humus (CEC)	mmol+/kg	152	> 128				
	CEC-saturation	%	94	> 95				
	Ca-saturation	%	84	80 - 90				
	Mg-saturation	%	6,8	6,0 - 10				
	K-saturation	%	2,5	2,0 - 4,0				
	Na-saturation	%	0,8	1,0 - 1,5				
	H-saturation	%	< 0,1	< 1,0				
	Al-saturation	%	< 0,1	< 1,0				

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Report-Id:

700443/003709395, 26-07-2023



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Results						low	rath.low	good	rath.high	high
	Unit	Result	Target value							
	Electric Conductivity	mS/cm 25°C	0,86	0,60 - 1,2						
	Unit	Result	Target value			low	rath.low	good	very good	
	Soil crumbling	score	10,0	6,0 - 8,0						
	Soil slaking	score	8,0	6,0 - 8,0						
	Risk on wind erosion	score	5,2	6,0 - 8,0						
	Unit	Result	Target value			low	rath.low	good	rath.high	high
Biological	Moisture retention cap.	mm	48							
	Microbial biomass	mg C/kg	120	255 - 765						
	Microbial activity	mg N/kg	54	35 - 58						
	Fungal/bacterial ratio		0,3	0,6 - 0,9						

Fertilisation recommendations

The result is compared with an agricultural target value and is categorized as low, rather low, good, rather high high. This is not an appreciation as meant in ISO 17025 (par. 7.8.6).

Legislation

The fertilisation recommendations aim to achieve an agronomical optimum yield and crop quality. The recommendations do not take any legal restrictions into consideration.

Recommend.

Recommend. Unit

Soil-based recommendation (for the coming 4 years)

Phosphate (P ₂ O ₅)	265	kg/ha	When recommendations are high, it is advised to split the amount during the 4 years, for instance supply half the amount biannially. The soil based recommendation is meant to level the soil stocks of phosphorus, potassium, calcium and magnesium to the required amounts.
Potassium (K ₂ O)	70	kg/ha	
Calcium (CaO)	140	kg/ha	
Magnesium (MgO)	125	kg/ha	The lime gift is based on an optimal pH of 6,0 For every tenth increase in pH a lime gift is required of 270 kg/ha.
Lime (nw)	2170	kg/ha	
Effective OM	7060	kg/ha	The amount of effective organic matter needed is calculated for a 4 year period. At the organic matter balance the yearly application of organic matter is calculated.

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Recommend.	Crop	Culture	Recommendation
Crop-based recommendation (annual)			
in kg/ha	Nitrogen (N)	Ware potatoes	236
		Spring-sown onions	88
		Sugarbeet	144
		Winter wheat	200
	Sulphate (SO ₃)	Ware potatoes	0
		Spring-sown onions	0
		Sugarbeet	5
		Winter wheat	35
	Phosphate (P ₂ O ₅)	Ware potatoes	85
		Spring-sown onions	55
		Sugarbeet	85
		Winter wheat	60
	Potassium (K ₂ O)	Ware potatoes	215
		Spring-sown onions	105
		Sugarbeet	125
		Winter wheat	95
	Calcium (CaO)	Ware potatoes	75
		Spring-sown onions	120
		Sugarbeet	70
		Winter wheat	35
	Magnesium (MgO)	Ware potatoes	0
		Spring-sown onions	0
		Sugarbeet	0
		Winter wheat	0
	Sodium (Na ₂ O)	Ware potatoes	
		Spring-sown onions	
		Sugarbeet	65
		Winter wheat	
	Zinc (Zn)	Ware potatoes	0
		Spring-sown onions	0,5
		Sugarbeet	0
		Winter wheat	0
	Manganese (Mn)	-	See the explanation.
	Copper (Cu)	Ware potatoes	0,25
		Spring-sown onions	0,25
		Sugarbeet	0,25
		Winter wheat	1,50
	Boron (B)	Ware potatoes	0
		Spring-sown onions	0
		Sugarbeet	0
		Winter wheat	0

Crop based recommendation

The crop-based recommendation is based upon the crop needs, average yields and climatic conditions and is corrected for soil nutrient stocks and the soil supplying capacity. During the growing season the SoilCropMonitor can be used for fertilization adjustments.

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Explanation

The results and/or the recommendations of this analysis are valid until 2027

For more information please use the following link:

<https://www.eurofins-agro.com/en/soil-analysis-explanation>

The soil based recommendation aims to maintain the soil nutrient stocks. The K, Ca and Mg recommendation will optimize the balance at the cation-exchange-capacity (CEC). It is advised to spread the soil based recommendation for nutrients and lime application across a 4 year period. When you have applied the soil based recommendation a new soil based analysis can be used to update the concentration of the nutrient stocks.

The crop based fertilization will feed the crop and improve its quality. Due to higher/lower yields and possible losses (e.g leaching) the amount of plant available nutrients can fluctuate. Therefore, we advise you to carry out a crop based analysis (Culture analysis) to determine the actual amount of available nutrients and to update the fertilization recommendations.

Look carefully at the appreciation of the nutrients on page 1. If the target values indicate that one or more nutrient quantities are very low, consult your advisor to level these quantities.

We have assumed the following yields, when calculating the crop based recommendations:

Ware potatoes	47,0
Spring-sown onions	49,0
Sugarbeet	82,0
Winter wheat	9,0

When your yield differentiates from the above, it is recommended to adjust your fertilization accordingly

Nitrogen:

The N recommendation relates to an annual dose. If possible, we recommend splitting this N dose into several applications. You can use our SoilCheck soil test in season to determine whether subsequent applications are necessary. This test measures the plant-available N (mineral N) in the soil among other things.

Sulphur:

Sulphur (S) is released by the degradation (mineralisation) of organic matter or manure. This mineralisation is performed by soil organisms. Soil organisms are not very active under colder conditions, which means not much S is released from the soil early in the spring. Therefore, it is sensible to fertilise with S for many early crops, even if the soil content is good or high.

Phosphate:

P-supplying capacity is 21 . The target range is 17 - 27

The P-buffering capacity indicates whether the P-soil stock is high enough to maintain the level of plant available P. When the buffering capacity (buffering power) is low, the plant available P will not remain on level during the growing season: it will decrease.

Potassium:**Calcium:**

Fertilization with calcium may benefit the soil structure.

You can reduce the calcium soil based recommendation with the amount of calcium applied with the lime.

Manganese:

Manganese deficiency is to be expected.

During periods of rapid growth, please apply foliar fertilizers containing Manganese.

Lime:

Give the lime prior to the most lime needing crop.

Note: with liming calcium and magnesium can be added.

Magnesium:

You can reduce the magnesium soil based recommendation with the amount of magnesium applied with the lime.

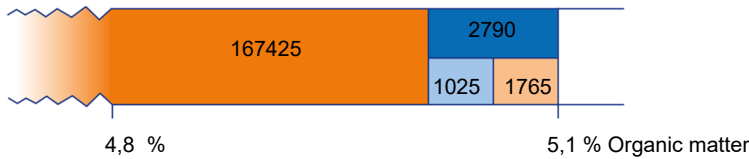
Soil life:

The biological soil fertility is measured by 3 characteristics, the microbial biomass, the microbial activity, and the fungal/bacterial ratio.

The acknowledgement of the measured results is based upon the amount of organic matter. There is not a recommendation given for the measured characteristics. On the basis of research projects there will be more information available.

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Organic matter Figure: Organic matter balance



Yearly breakdown rate (percentage) of the total organic matter content (%): 1,6

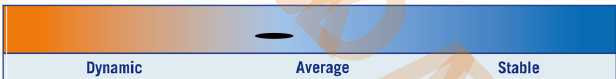
- Stock of organic matter which will remain after 1 year in the sampled layer if no (effective) organic matter is supplied.
- Total required supply of effective organic matter as a result of the degradation of the organic matter.
- Supply through crop residues (average within provided rotation scheme or crops).
- Remaining to be supplied through e.g. animal manure, green manures and/or compost.

Crop (residue)	Culture:	Input of effective organic matter
Ware potatoes		875
Spring-sown onions		300
Sugarbeet		1275
Winter wheat		1640
Average input/year		1025

In case of cereals we assume removal of straw.

For increasing the soil organic matter content by 0.1%: 3340 kg effective organic matter per hectare is needed.

Figure: Quality of the organic matter

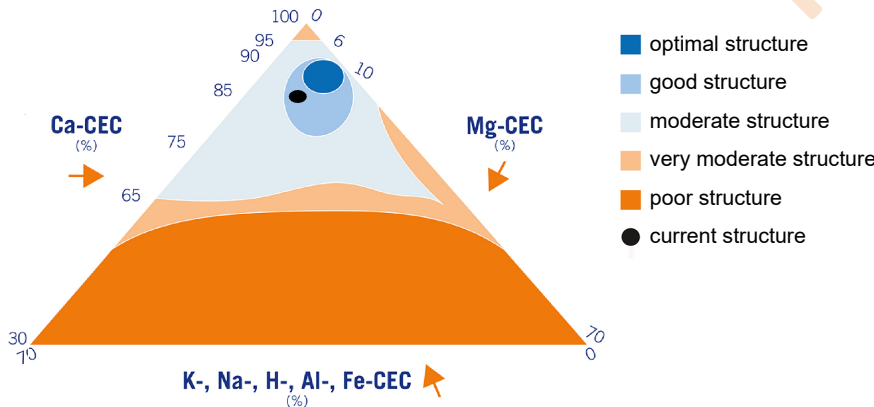


Organic matter consists primarily of C, N, P, S. If the organic matter contains relatively high amounts of N and/or S, this makes it attractive to soil organisms. Soil organisms happily eat this organic matter. N and S are released in the process and the amount of organic matter decreases slightly (dynamic organic matter). Organic matter can also contain a lot of C. This is generally less attractive to soil organisms (bacteria). As a result, the organic matter is not consumed as quickly by the soil organisms; making the organic matter more stable. Stable organic matter contributes - among other factors - to the workability of the soil and the looseness. Dynamic organic matter contributes primarily to the release of N and S and is therefore a source of these nutrients for the crop. The quality of the organic matter can be changed (gradually) by paying attention to the properties of soil improvers such as animal manure, compost and crop residues.

Physical

The assessment of soil structure is based on the Ca-CEC, K-CEC, and Mg-CEC ratio. Actual soil structure is - of course - not merely depending on ratio, but also on weather conditions, moisture condition of the soil, and the weight of the machinery.

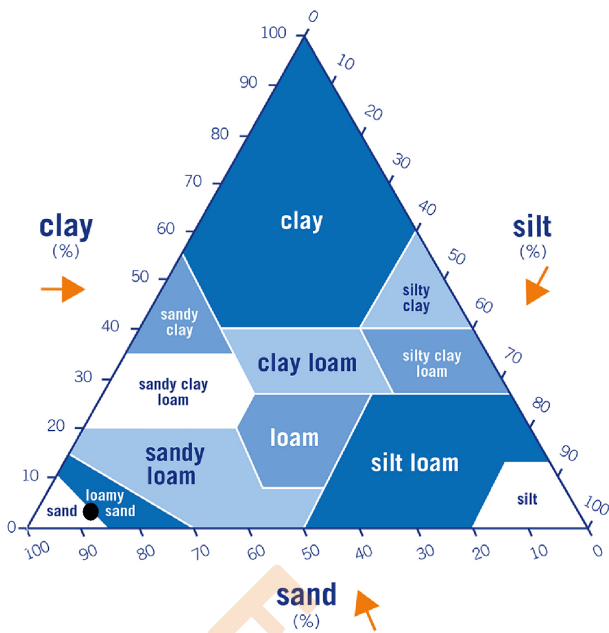
Figure: Structure triangle



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Physical

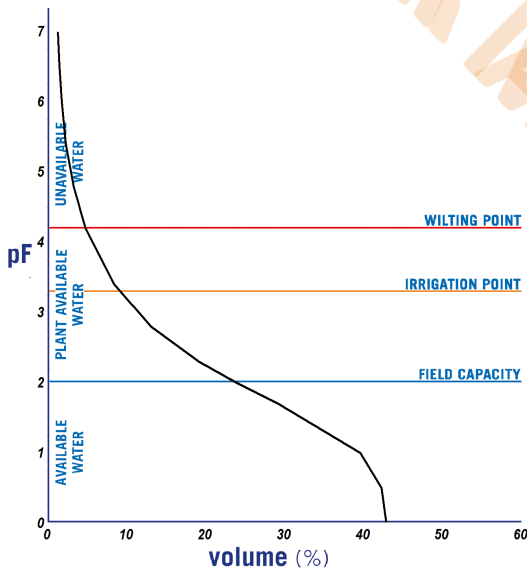
Figure: Texture triangle



Besides clay, the silt and sand fractions are presented as well. Clay is smaller than 2 micrometer (μm), silt particles are 2-50 μm and sand particles are larger than 50 μm . The relative distribution of soil particles is used to estimate the risk of slaking. Slaking causes the soil pores to be clogged with smaller particles and degrades soil structure. The risk of slaking is greatest at 10-20% clay.

Soil crumbling score is: good, however the evaluation of soil crumbling status is also depending on crop type. Considering the results, the chance of soil slaking is small.

Figure: Water retention curve



The amount of plant available water in the sampled layer is 48 mm. This is the maximum amount you should irrigate. All excess irrigation will drain off the parcel or will sink to deeper layers.

Field capacity (pF 2,0):	24,0	% moisture
Irrigation point (pF 3,3):	9,1	% moisture
Wilting point (pF 4,2):	4,9	% moisture

Crops have difficulties to obtain water when the actual moisture level is below pF 3,3. When you are able to measure the moisture level, start with irrigation if the moisture content of the parcel is at 9,1 % and irrigate 37 mm.

The actual moisture level can be measured by using a soil moisture sensor, or collect soil from ten spots in the parcel. Measure the weight of the moist soil and the weight after 24 h drying. The difference between moist and dry soil is an indication of the moisture level of the parcel.

Contact & info

Soil layer:	0 - 25 cm
Sample was taken by:	Eurofins Agro, Monsternemer
Contact sample taking:	Klantenservice Agro: 0888761010
Sampling method:	W-pattern, at least 40 sub samples, according to Eurofins Agro standard MIN 1000

If the following information is shown in the reports, this information may have been provided by the client and may affect the valuation, advice and/or analysis result:
sampling depth, crop, culture.

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Method	Result	Unit	Method	RvA
Results analyses				
Total nitrogen stock	1740	mg N/kg	Em: NIRS	Q
S-plant available	5,6	mg S/kg	Em: CCL3 (Gw NEN 17294-2)	
Total sulphur stock	430	mg S/kg	Em: NIRS	Q
P-plant available	1,3	mg P/kg	Em: CCL3 (Gw NEN 15923-1)	Q
P-soil stock	27	mg P ₂ O ₅ /100 g	PAL1: Gw NEN 5793	Q
P-soil stock	12	mg P/100 g	PAL1: Gw NEN 5793	Q
K-plant available	89	mg K/kg	Em: CCL3 (Gw NEN 17294-2)	
K-soil stock	3,8	mmol+/kg	Em: NIRS	
Ca-plant available	0,4	mmol Ca/l	Em: NIRS	
Ca-soil stock	136	mmol+/kg	Em: NIRS	
Mg-plant available	83	mg Mg/kg	Em: CCL3 (Gw NEN 17294-2)	
Mg-soil stock	10,3	mmol+/kg	Em: NIRS	
Na-plant available	36	mg Na/kg	Em: CCL3 (Gw NEN 17294-2)	
Na-soil stock	1,2	mmol+/kg	Em: NIRS	
Chloride	2,0	mg Cl/100 g	Em: WTR9	
Si-plant available	7920	µg Si/kg	Em: CCL3 (Gw NEN 17294-2)	
Fe-plant available	2060	µg Fe/kg	Em: CCL3 (Gw NEN 17294-2)	
Zn-plant available	420	µg Zn/kg	Em: CCL3 (Gw NEN 17294-2)	
Mn-plant available	3580	µg Mn/kg	Em: CCL3 (Gw NEN 17294-2)	
Cu-plant available	21	µg Cu/kg	Em: CCL3 (Gw NEN 17294-2)	Q
Co-plant available	6,6	µg Co/kg	Em: CCL3 (Gw NEN 17294-2)	Q
B-plant available	181	µg B/kg	Em: CCL3 (Gw NEN 17294-2)	
Mo-plant available	< 4	µg Mo/kg	Em: CCL3 (Gw NEN 17294-2)	
Se-plant available	2,7	µg Se/kg	Em: CCL3 (Gw NEN 17294-2)	
Acidity (pH)	5,2		Em: NIRS	
C-organic	2,41	%	Em: NIRS	Q
Organic matter	5,1	%	Em: NIRS	Q
C-inorganic	0,03	%	Em: NIRS	
Carbonate lime	0,2	%	Em: NIRS	
Clay (<2 µm)	3	%	Em: NIRS	
Silt (2-50 µm)	9	%	Em: NIRS	
Sand (>50 µm)	83	%	Em: NIRS	
Clay-humus (CEC)	152	mmol+/kg	Em: NIRS	
Electric Conductivity	0,86	mS/cm 25°C	Em: NIRS	
Microbial biomass	120	mg C/kg	Em: NIRS	
Microbial activity	54	mg N/kg	Em: NIRS	
Fungal biomass	23	mg C/kg	Em: NIRS	
Bacterial biomass	91	mg C/kg	Em: NIRS	
Bulk density	1335	kg/m ³	Em: NIRS	

The values stated on page 1 and 2 under 'Result' are calculated from the above mentioned analysis results.

Q Method accredited by RvA

Em: Method Eurofins Agro, Gw: Equivalent of, Cf: In conformity with

Results are reported in dry soil.

The analyses were done at Eurofins Agro, Wageningen (NL).

The results relate exclusively to the sample taken and received by Eurofins Agro, and to the material processed on 02-11-2023, and therefore to the sample analysed. For a detailed description of the sampling and analysis methods used, visit www.eurofins-agro.com