Bodemindicatoren voor Landbouwgronden in Nederland (BLN)



A set of indicators to measure soil quality of agricultural soils in NL

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Why to measure soil quality?

- National Program Agricultural soils in the Netherlands (2019):
 - Agricultural soils are sustainably managed in 2030
 - A zero measurement of soil quality will be done in 2020
 - Comprehensive, common and uniform
 - Set of indicators need to be identified





Bodemindicatoren voor Landbouwgronden in NL BLN-indicator set, version 1.0

- Comprehensive soil quality review:
 - Several functions: production, climate, water, biodiversity, ...
- From a scientific perspective:
 - Indicators with accurate and reliable measurement methods
 - Added cheap and fast alternative methods
- Selected for:
 - National and regional monitoring of soil quality
 - Application on field level by farmers

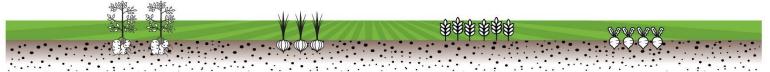


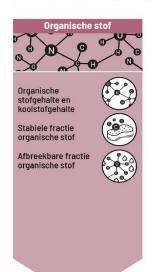


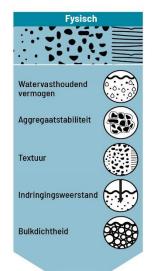


BODEMINDICATOREN VOOR LANDBOUWGRONDEN IN NEDERLAND (BLN)

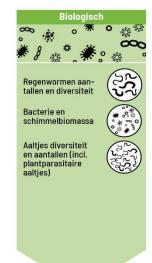
Voor uniforme bodemkwaliteitsbeoordeling en duurzaam beheer

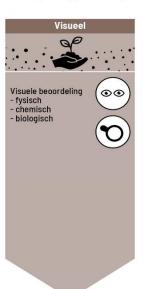












MET METING VAN BODEMKWALITEIT GERICHT WERKEN AAN VERSTERKEN BODEMFUNCTIES

PRODUCTIE • WATERREGULATIE • KOOLSTOFOPSLAG • RECYCLING NUTRIËNTEN • BIODIVERSITEIT



BLN indicatorset, version 1.0

Organic matter content	%	Logg on ignition	
Carbon content		Loss on ignition	NIRS
2 Carbon content	%	Dumas	NIRS
B Labile organic matter fraction	mg kg ⁻¹	Hot water extraction (HWC)	n.a.
Water holding capacity	%, mm	Sandbox / pressure pan	Based on texture & OS%
Aggregate stability	-	Wet sieving method	n.a.
5 Texture	%	Pipet method	NIRS
Penetration resistance	MPa	Penetrometer	
B Dry bulk density	kg m ⁻³	Mass after drying 105°C	Based on OS%
Acidity (pH)	-	Extraction in CaCl ₂	
0 Total nitrogen	mg kg ⁻¹	Hassink (1995)	NIRS
1 Potential mineralisable nitrogen (PMN)	mg kg ⁻¹	Anaerob incubation	NIRS
Phosphate status (P-AI, P-CaCl ₂)	g kg ⁻¹ , mg 100 ml ⁻¹	Extraction in ammonium lactate-acetic acid, CaCl ₂	NIRS
3 Potassium status (K-CEC, K-CalCl ₂)	mmol ⁺ /kg, g kg ⁻¹	Extraction in Cohex, CaCl ₂	NIRS
4 Nematod numbers and diversity (incl. plantparasitic nematods)	# taxa, # 100 ml ⁻¹ grond	Microscopy	PCR
5 Bacteria & fungi biomass	μg kg ⁻¹	Microscopy	PLFA
6 Earthworm numbers and diversity	# m ⁻² , kg m ⁻²	Visual	n.a.
7 Visual soil assessment	Various	Visual	n.a.
3 1 5 7 8 9 6 1 2 3 4	Labile organic matter fraction Water holding capacity Aggregate stability Texture Penetration resistance Dry bulk density Acidity (pH) Total nitrogen Potential mineralisable nitrogen (PMN) Phosphate status (P-AI, P-CaCl ₂) Potassium status (K-CEC, K-CalCl ₂) Nematod numbers and diversity (incl. plantparasitic nematods) Bacteria & fungi biomass Earthworm numbers and diversity	Labile organic matter fraction Water holding capacity Aggregate stability Texture Penetration resistance Dry bulk density Acidity (pH) Total nitrogen Potential mineralisable nitrogen (PMN) Phosphate status (P-AI, P-CaCl ₂) Potassium status (K-CEC, K-CalCl ₂) Nematod numbers and diversity (incl. plantparasitic nematods) Bacteria & fungi biomass py kg-1 # taxa, # 100 ml-1 grond pg kg-1 # taxa, # 100 ml-1 grond	Labile organic matter fraction Water holding capacity Aggregate stability - Wet sieving method Penetration resistance Penetration resistance Dry bulk density Acidity (pH) Total nitrogen Potential mineralisable nitrogen (PMN) Phosphate status (P-AI, P-CaCl ₂) Potassium status (K-CEC, K-CalCl ₂) Rematod numbers and diversity Rematod numbers and diversity Bacteria & fungi biomass Earthworm numbers and diversity Earthaction (HWC) %, mm Sandbox / pressure pan Wet sieving method Pipet method Penetrometer Mass after drying 105°C Extraction in CaCl ₂ Hassink (1995) Anaerob incubation Extraction in ammonium lactate-acetic acid, CaCl ₂ Extraction in Cohex, CaCl ₂ Microscopy Microscopy Visual

Further developments of BLN-indicatorset, towards version 2.0

- 1. Evaluation of the BLN indicator set version 1.0
- 2. Improve methodology of soil quality assessment
- 3. Selection system of indicators, based monitoring objective
- 4. Evaluation of other indicators & measurement techniques
- 5. Establishment of more reference and target values
- 6. Develop farmer tools based on the BLN-indicator set
- → Do this in collaboration and coordination within EJP SOIL





Thank you for your attention

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