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RESEARCH ARTICLE

SOIL CARBON CHECK: A TOOL FOR MONITORING AND GUIDING SOIL CARBON SEQUESTRATION IN FARMER FIELDS

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SUPPLEMENTARY MATERIALS

In this supplementary material file, we present additional data and information related to:

S1 Soil Carbon Check report

S2 NIRS Calibration and Validation of soil samples from various locations

S1 Soil Carbon Check Report

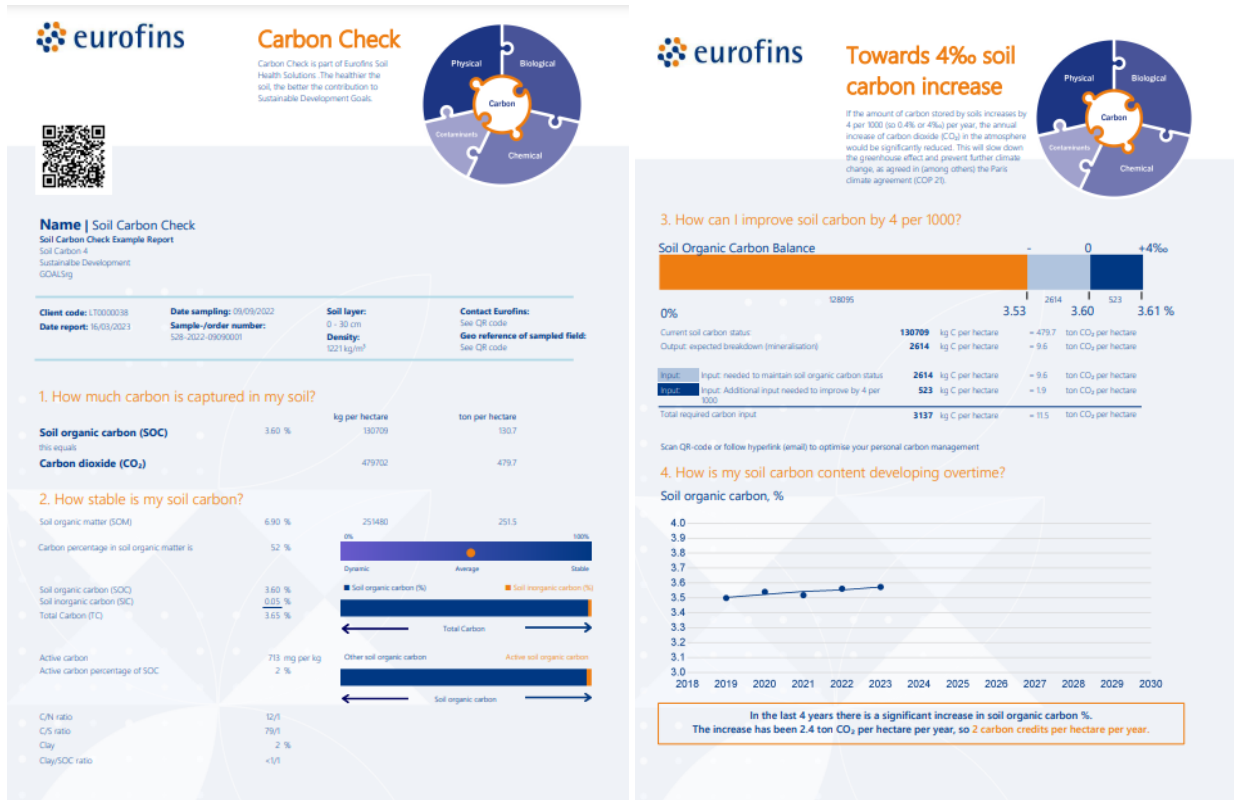


Fig. S1 Soil Carbon Check Report. NIRS soil characteristics are converted to the Soil Carbon Check report. The report addresses four questions: (1) How much carbon is captured in my soil? (2) How stable is my soil carbon? (3) How can I improve soil carbon by 4 per 1000? (4) How is my carbon content developing over time?

S2 NIRS Validation Sample Locations and Results

Samples for validation

For the validation samples were taken in several European countries and in China, Vietnam and New Zealand. Chinese samples originate from 14 different provinces. The samples from Vietnam originate from 9 different provinces. New Zealand samples were taken from 41 different places across the country. Details of the locations can be obtained by contacting the first author (Arjan Reijneveld, ArjanReijneveld@eurofins.com)

Results are presented in Table S1, Table S2, and Table S3

Table S1 Results of the calibration (first row) and validation (next rows, for different countries) of the determination of soil inorganic carbon (SIC) contents via NIRS

Type	Country	Average SIC content (%)	St.Dev.	RMSEP	BIAS	R^2	n	P5	P95
Calibration	/	0.25	0.44	0.145	0.001	0.97	15,864	0.03	0.97
Validation	China	0.17	0.21	0.050	0.03	0.95	120	0.00	0.68
	Vietnam	0.08	0.13	0.040	0.01	0.91	134	0.00	0.13
	New Zealand	0.09	0.05	0.043	0.00	0.46	153	0.02	0.19
	Belarus	0.09	0.17	0.062	0.06	0.95	77	0.01	0.15
	Finland	0.16	0.38	0.057	0.01	0.98	243	0.02	0.28
	Germany	0.19	0.26	0.061	0.02	0.98	96	0.04	0.72
	France	0.33	0.83	0.071	0.00	0.99	48	0.00	1.04
	Lithuania	0.21	0.27	0.060	-0.05	0.96	100	0.02	0.86
	Norway	0.14	0.04	0.033	0.00	0.98	55	0.03	0.15
	Sweden	0.09	0.10	0.059	0.04	0.72	41	0.01	0.17
	United Kingdom	0.62	1.38	0.139	0.06	1.00	54	0.07	4.70
	The Netherlands	0.22	0.31	0.061	-0.01	0.96	1863	0.03	0.94

Note: Samples have been taken in different countries, but were analyzed following the same standard procedures. Results are presented for the average, standard deviation, root mean squared error of prediction (RMSEP; average difference between calculated and measured values), bias, determination coefficient (R^2), number of samples (n), the 5-, and 95-percentile values.

Table S2 Results of the calibration (first row) and validation (next rows, for different countries) of the determination of soil organic matter (SOM) contents via NIRS

Type	Country	Average SOM content (%)	St.Dev.	RMSEP	BIAS	R^2	n	P5	P95
Calibration	/	5.45	7.34	0.6	0.00	1.00	24,825	1.60	18.0
Validation	China	4.09	2.80	0.4	0.00	0.98	137	0.59	9.95
	Vietnam	5.71	1.85	0.2	-0.01	0.99	167	2.10	8.24
	New Zealand	14.1	10.28	0.4	-0.04	1.00	153	5.54	26.7
	Belarus	15.2	13.6	1.0	0.02	0.98	87	2.67	40.6
	Finland	8.02	8.12	1.2	0.60	0.97	243	2.56	18.7
	Germany	4.70	1.25	0.2	0.02	0.97	100	2.75	6.77
	France	4.18	1.71	0.3	-0.15	0.97	48	1.78	7.44
	Lithuania	5.40	5.52	0.6	0.05	0.99	100	2.17	11.4
	Norway	5.65	2.11	0.3	-0.09	0.98	59	3.96	9.78
	Sweden	10.3	8.57	0.7	0.02	0.99	49	2.25	27.1
	United Kingdom	7.69	3.45	0.4	0.50	0.98	54	4.51	14.7
	The Netherlands	5.86	4.63	0.5	0.00	0.99	2259	2.06	14.3

Note: Samples have been taken in different countries, but were analyzed following the same standard procedures. Results are presented for the average, standard deviation, root mean squared error of prediction (RMSEP; average difference between calculated and measured values), bias, determination coefficient (R^2), number of samples (n), the 5-, and 95-percentile values.

Table S3 Results of the calibration (first row) and validation (next rows, for different countries) of the determination of soil clay (< 2 μm) contents via NIRS

Type	Country	Average clay content (%)	St.Dev.	RMSEP	BIAS	R^2	n	P5	P95
Calibration	/	11.1	11.2	1.8	0.07	0.98	49,121	1.0	38.0
Validation	China	30.6	11.0	1.8	-0.04	0.98	47	15.9	49.4
	Vietnam	36.1	15.6	2.0	0.00	0.99	168	8.1	57.6
	New Zealand	17.1	11.1	1.5	-0.23	0.99	147	2.3	38.5
	Belarus	3.4	1.9	1.1	0.04	0.77	87	1.0	6.9
	Finland	15.9	12.9	2.6	-0.87	0.97	243	1.4	42.1
	Germany	17.0	5.9	1.5	-0.01	0.94	96	7.8	28.2
	France	19.2	12.6	2.0	-0.90	0.99	48	2.4	41.8
	Lithuania	8.7	3.9	1.1	0.01	0.93	100	2.1	14.8
	Norway	10.5	8.0	1.6	0.14	0.96	59	2.1	27.1
	Sweden	17.7	14.8	1.9	-0.02	0.99	50	1.2	42.8
	United Kingdom	21.4	9.9	4.7	0.83	0.81	54	10.2	34.7
	The Netherlands	10.3	10.9	1.3	0.05	0.99	1852	1.0	31.9

Note: Samples have been taken in different countries, but were analyzed following the same standard procedures. Results are presented for the average, standard deviation, root mean squared error of prediction (RMSEP; average difference between calculated and measured values), bias, determination coefficient (R^2), number of samples (n), the 5-, and 95-percentile values.