Database with monitoring data

Executive Summary

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KU LEUVEN

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1	Wageningen Environmental Research	WEnR	Netherlands
2	University of Newcastle upon Tyne	UNEW	United Kingdom
3	Katholieke Universiteit Leuven	KUL	Belgium
4	University of Gloucestershire	UoG	United Kingdom
5	University Hohenheim	UH	Germany
6	Research Institute for Knowledge Systems	RIKS	Netherlands
7	Technical University of Crete	TUC	Greece
8	Joint Research Centre	JRC	Italy
9	University of Bern	UNIBE	Switzerland
10	Milieu LTD	MLTD	Belgium
11	Norwegian Institute of Bioeconomy Research	NIBIO	Norway
12	Bodemkundige Dienst van België	BDB	Belgium
13	Aarhus University	AU	Denmark
14	Game & Wildlife Conservation Trust	GWCT	United Kingdom
15	Teagasc	TEAGASC	Ireland
16	Soil Cares Research	SCR	Netherlands
17	Instituto Politecnico De Coimbra	IPC/ESAC	Spain
18	National Research and Development Institute for Soil Science, Agrochemistry and Environmental Protection	ICPA	Romania
19	University of Padova	UNIPD	Italy
20	Institute of Agrophysics of the Polish Academy of	IAPAN	Poland
21	Wageningen University	WU	Netherlands
22	University of Pannonia	UP	Hungary
23	Swedish University of Agricultural Sciences	SLU	Sweden
24	Agro Intelligence Aps.	AI	Denmark
25	Crop Research Institute	VURV	Czech Republic
26	University of Almeria	UAL	Spain
27	Fédération Régionale des Agrobiologistes de Bretagne	FRAB	France
28	Scienceview Media BV	SVM	Netherlands
29	Milieu Consulting SPRL	Milieu Consulting	Belgium

Deliverable 5.1:
Report: Database with monitoring data

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Executive summary

The Deliverable 5.1 reports and explains the database, which the SoilCare project developed and used for storing the monitoring results. In this project, a total of 16 Study Sites (SS) performed experiments on Soil Improving Cropping systems (SICS). The storage and compilation of the experimental results is a task for Work Package 5 (WP5), while the common methodology to monitor and assess SICS was proposed by WP4. The novelty is that WP5 is storing all the results in one common database. Most earlier projects with numerous study sites stored data from their experiments in their separate databases and provided their separate reports. It was therefore often difficult to compare across study sites and draw general conclusions.

Designing such a common database has several challenges. Every experiment at every study site is characterized by a large number of relatively complex variables. The terminology of those variables needs to be unified across study sites.

From a database point of view, the total amount of data is very small but the structure is relatively complex and diverse. A compromise solution is that study sites fill in their data into specially designed spreadsheets with a protected structure but with limited control of the data. The initial screening of the data is performed by WP5 and after weeding out obvious inconsistencies and errors in collaboration with SS managers, the automatic data-entry of the spreadsheet into the database is done by WP5. The first season data-entry required substantial interaction between WP5 and the SS's. However, subsequent completion of more seasons went smoothly. The database architecture is described in this document and is fully based on modern open-source software. The kernel consists of a PostgreSQL database. A "Use Case" approach typical for software and system's engineering was implemented for designing and programming the import and query system, which is accessed via a web-accessible interface.

The major benefit of our novel approach is not only that the data can be safeguarded in a common database, but also that they are more consistent and therefore easier to compare and combine. Although the SS's can query the database, WP5 has also developed R-scripts for statistical analysis of data within the database, so that also a unified statistical approach can be followed. As WP5 can execute the statistical analysis and deliver results by graphs and tables to the SS's, this also creates both a major efficiency gain for the SS's not having to execute the statistics themselves. The SS's and WP's can concentrate on the interpretation and a more consistent comparison across experiments is possible.