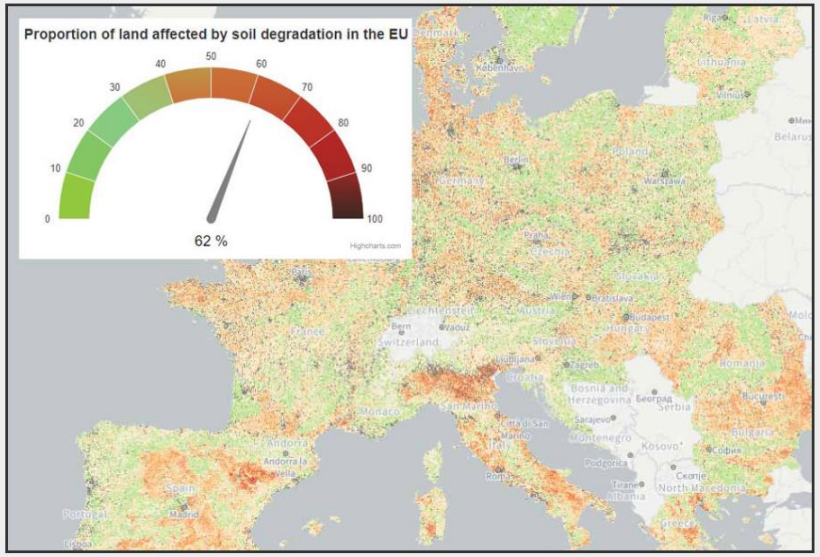
SoilWise project introduction

Fenny van Egmond – ISRIC

Why provide your data and knowledge?

The Mission Soil Projects are **data/knowledge providers**.

Each Project has target groups: Land managers, Scientific community, Policy makers, etc.



Soil degradation in the EU

WHY Sharing data and knowledge?

- ✓ Reach your target groups
- ✓ Contribute to the Mission Soil Objectives
- ✓ Have persistent repository for long term impact
- ✓ Improve Soil health in Europe!

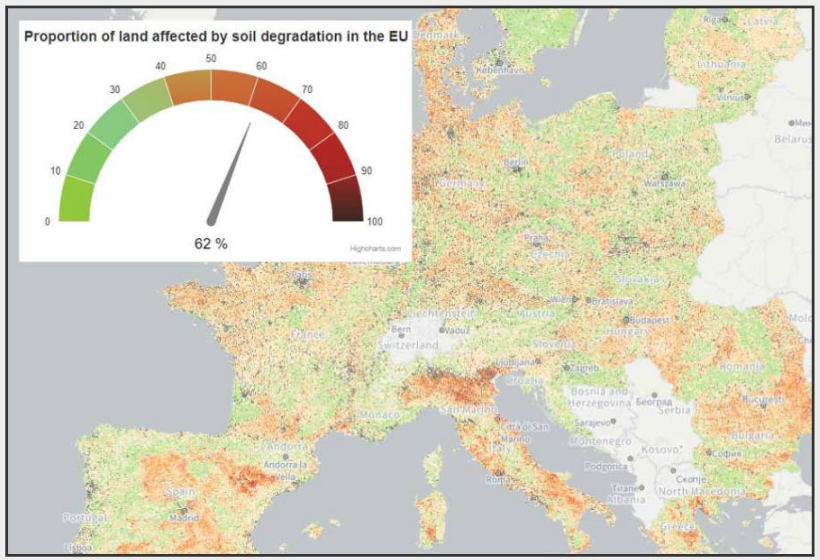
Funded by the European Union

This project has received funding from the Horizon Europe research and innovation programme under Grant Agreement No 101112838

SoilWise KNOWLEDGE & DATA FLOWS

Why use additional data and knowledge?

The Mission Soil Projects are (also) **data/knowledge users**.



Soil degradation in the EU

Because:

- ✓ Find data and knowledge to supplement your own
- ✓ Answer more research questions in the same time
- ✓ Answer questions that a single project or expertise cannot by itself : collaboration in Mission Soil Clusters
- ✓ Contribute to the Mission Soil Objectives
- ✓ Have long term impact with improved results
- ✓ Improve Soil health in Europe!

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SoilWise KNOWLEDGE & DATA FLOWS

Challenging to find the right data and knowledge

Let alone access and combine easily

F

Findable

SoilWise

KNOWLEDGE & DATA FLOWS

Develop, test and deliver a prototype for long-term knowledge and data repository. *EU Mission Soil project, Sept 2023-Aug 2027, 15 partners*

the European Union

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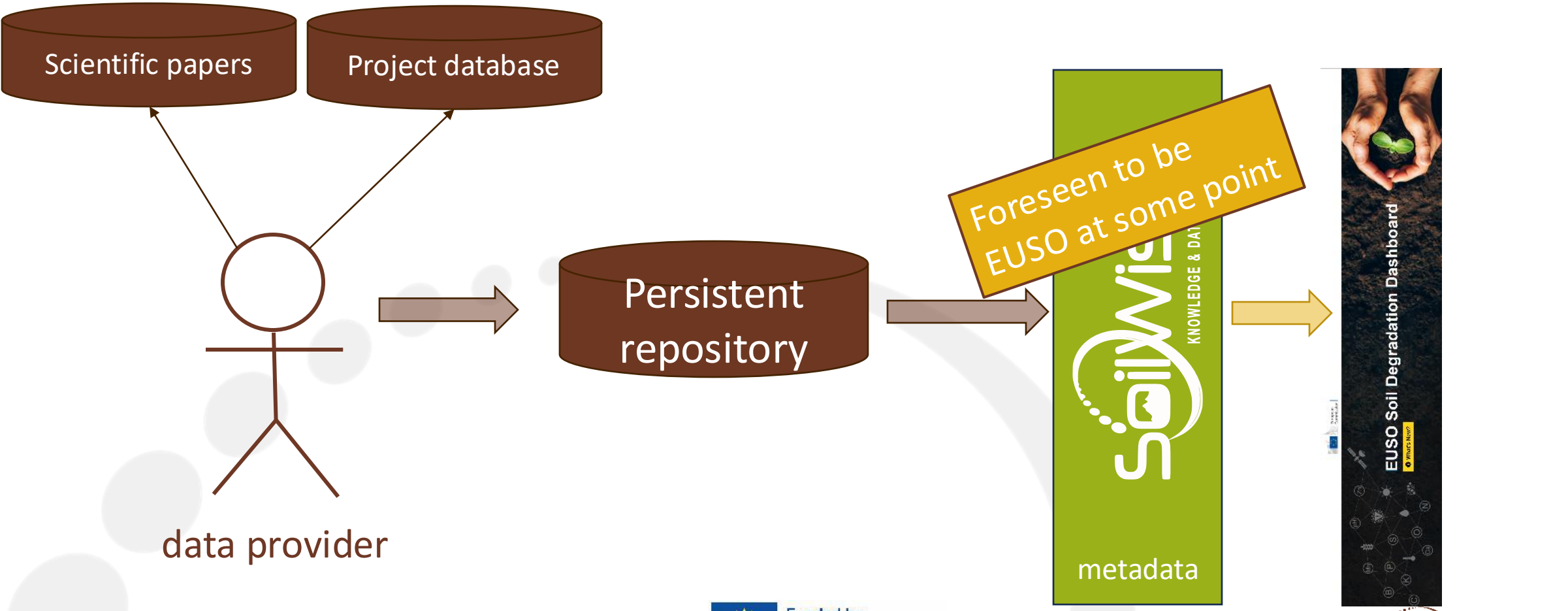
SoilWise KNOWLEDGE & DATA FLOWS

Possible workflow knowledge and data



Funded by the European Union
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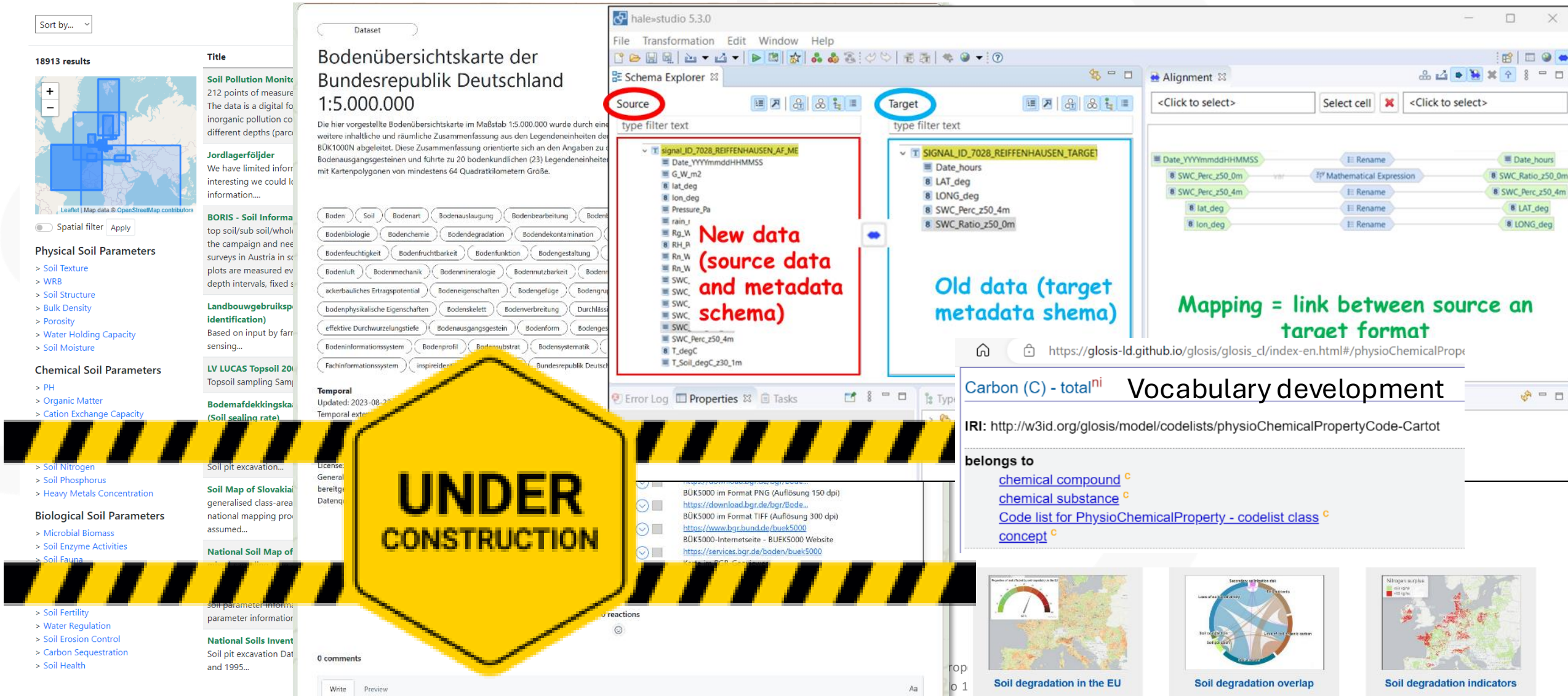
Components

https://soilwise-he.containers.wur.nl/cat/



What are the plans?

Project SoilWise intention is:

- to provide a single access point to soil data and knowledge
- to index available data & knowledge
- to establish catalog federation
- to make your (data and knowledge) life easier

SoilWise intention is NOT:

- to copy & store your data
- to control your data
- to steal your data
- to use your data without your permission

Funded by the European Union

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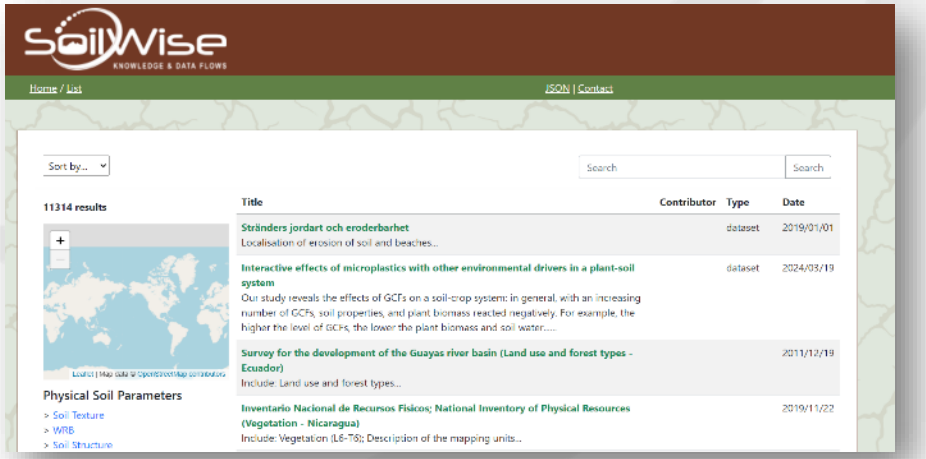
SoilWise KNOWLEDGE & DATA FLOWS

Main message

To develop a useful and functional Soil Data and Knowledge Infrastructure, the **collaboration efforts (and benefits from the outcomes) need to be mutual for all involved stakeholders** (EUSO and Mission Soil Horizon projects' end-users included)

Data provider



Data user

Or both?

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SoilWise
KNOWLEDGE & DATA FLOWS

Demonstrations of repository functionality

Celine, xxxx

Narrative MRV

Still to update

Fenny van Egmond (ISRIC)

14/11/2024

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An MRV data question

As a researcher in MRV, I need input data and parameters for my model on soil carbon sequestration and for upscaling.

For this, I need as harmonised input information in the right format on **soil organic carbon content, other soil data, land use, crop, biomass and climate information at regional level for region X**

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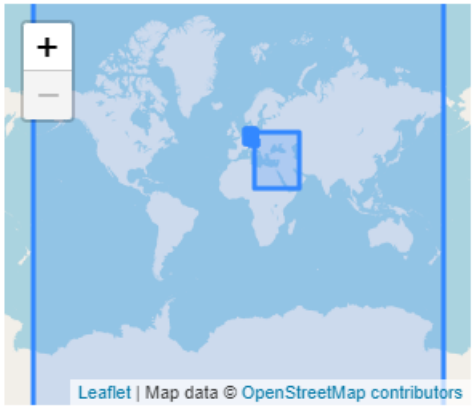
SoilWise KNOWLEDGE & DATA FLOWS

28 results



Spatial filter Apply

Physical Soil Parameters

> *Soil Texture* x

Chemical Soil Parameters

> PH
> Organic Matter
> Cation Exchange Capacity
> Electrical Conductivity
> Nutrient Content
> Soil Carbon
> Soil Nitrogen
> Soil Phosphorus
> Heavy Metals Concentration

Biological Soil Parameters

> Microbial Biomass
> Soil Enzyme Activities
> Soil Fauna
> Soil Respiration

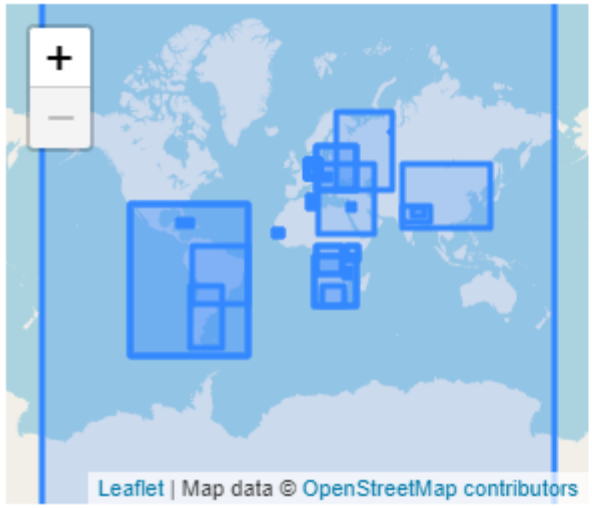
Soil Functions

> Soil Fertility

Title	Contributor	Type	Date
Herbivore Trampling As An Alternative Pathway For Explaining Differences In Nitrogen Mineralization In Moist Grasslands Studies addressing the role of large herbivores on nitrogen cycling in grasslands have suggested that the direction of effects depends on soil fertility. Via selection for high quality plant species and input of dung and urine, large herbivores have.....		document	2024/11/13
Towards ecologically functional riparian zones: A meta-analysis to develop guidelines for protecting ecosystem... Riparian zones contribute with biodiversity and ecosystem functions of fundamental importance for regulating flow and nutrient transport in waterways. However, agricultural land-use and physical changes made to improve crop productivity and yield have.....		document	2024/11/13
Statistiques spatio-temporelles sur les propriétés agronomiques des sols agricoles en France issues de la Base de... In France, farmers commission about 250,000 soil-testing analyses per year to assist them managing soil fertility. The number and diversity of origin of the samples make these analyses an interesting and original information source regarding		document	2024/11/13
First German Agricultural Soil Inventory – Core dataset: LABORATORY DATA The Federal Republic of Germany is obliged to report all anthropogenic sources and sinks of greenhouse gases on a national scale. Changes in soil organic carbon (SOC) stocks are among these sources and sinks. Furthermore, soil organic matter is a key.....	Johann Heinrich von Thünen-Institut, Johann Heinrich von Thünen-Institut, Johann Heinrich von Thünen-Institut	dataset	2020/09/16

Nise
OWLEDGE & DATA FLOWS

43 results



Spatial filter Apply

Physical Soil Parameters

> Soil Texture
> WRB
> Soil Structure
> Bulk Density
> Porosity
> Water Holding Capacity
> Soil Moisture

Chemical Soil Parameters

> *Organic Matter* x

Biological Soil Parameters

Title	Contributor	Type	Date
First German Agricultural Soil Inventory – Core dataset: LABORATORY DATA The Federal Republic of Germany is obliged to report all anthropogenic sources and sinks of greenhouse gases on a national scale. Changes in soil organic carbon (SOC) stocks are among these sources and sinks. Furthermore, soil organic matter is a key.....	Johann Heinrich von Thünen-Institut, Johann Heinrich von Thünen-Institut, Johann Heinrich von Thünen-Institut	dataset	2020/09/16
SOTER-based soil parameter estimates (SOTWIS) for Central and Eastern Europe, version 1.0 This harmonized set of soil parameter estimates for Central and Eastern Europe has been derived from a revised version of the 1:2.5M Soil and Terrain (SOTER) Database for Central and Eastern Europe (SOVEUR ver. 1.1) and the ISRIC-WISE soil profile.....	ISRIC - World Soil Information	dataset	2021/07/14
INSPIRE: Organic Matter Content of Top-Soils in Germany 1:1,000,000 (BUEK1000-HUMUS-OB) The map "Organic Matter Content of Top-Soils in Germany 1:1,000,000 (INSPIRE)" highlights the results of a Germany-wide compilation of typical soil organic matter contents in top-soils differentiated according to groups of soil parent material, four.....	Bundesanstalt für Geowissenschaften und Rohstoffe (BGR)	dataset	2023/08/22
Soil and Terrain Database (SOTER) for China The Soil and Terrain database for China primary data (version 1.0), at scale 1:1 million (SOTER_China), was compiled of enhanced soil information within the framework of the FAO's program of Land Degradation Assessment in Drylands (LADA).	ISRIC - World Soil Information, ISRIC - World Soil Information, ISRIC - World Soil Information	dataset	2021/07/14

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SoilWise KNOWLEDGE & DATA FLOWS

An MRV data question

As a researcher in MRV, I need to understand and discuss SOC changes at ICOS sites, I have the regular soil data.

For this, I need additional available information on other variables (e.g. mineralogy). If such data is available in one repository, I will avoid having to do again an inventory of available soil databases.

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SoilWise KNOWLEDGE & DATA FLOWS

SoilWise
KNOWLEDGE & DATA FLOWS

Home

JSON | Contact

Soilwise Soil Info hub

SoilWise will provide an integrated and actionable access point to scattered and heterogeneous soil data and knowledge in Europe, making them FAIR (Findable, Accessible, Interoperable and Reusable) and improve trust, willingness, and ability to share and re-use soil data and knowledge. In three project development cycles, co-creation and co-validation by multi-stakeholder groups are the centre of project activities. SoilWise recognises existing workflows and repositories for specific user needs and aims to work with them to enhance their discoverability, approachability and interconnection. An open, modular, scalable and extensible knowledge and data repository building on existing and new technologies will be provided while respecting data ownership, access policies and privacy. AI- and ML- techniques will be employed to interlink scattered data and knowledge, automatise the processes, infer new knowledge and increase FAIRness. SoilWise applies infrastructure thinking instead of project thinking to design a repository for at least a decade to support EUSO evolvement accordingly.

This is an early prototype of the repository, deployed with the goal to generate feedback to improve the software and content in upcoming iterations. Please provide your feedback via Github

Search in the catalogue

mineralogy

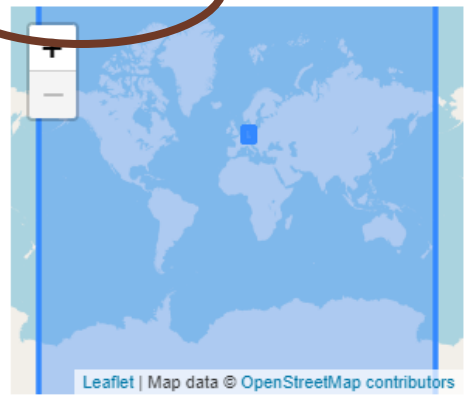
Submit

Recent changes

Sort by...

mineralogy Search

43 results



Spatial filter Apply

Physical Soil Parameters

> Soil Texture
> WRB
> Soil Structure
> Bulk Density
> Porosity
> Water Holding Capacity
> Soil Moisture

Chemical Soil Parameters

> PH
> Organic Matter
> Cation Exchange Capacity

Title	Contributor	Type	Date
Investigation Of Runoff Generation In A Pristine, Poorly Gauged Catchment In The Chilean Andes I: A Multi-Method... AbstractCatchment scale hydrological process studies in southern Chile are of special interest as little research at this scale has been carried out in this region. In particular, the young volcanic ash soils, which are typical for this area, are not.....		document	2024/11/12
Regional Variation In Soil Carbon And Δ13c In Forests And Pastures Of Northeastern Costa Rica Recent studies suggest that the direction and magnitude of changes in soil organic carbon (soil C) pools following forest-to-pasture conversion in the tropics are dependent upon initial soil conditions and local factors (e.g. pre-conversion soil C.....		document	2024/11/12
Silicate Weathering In Temperate Forest Soils: Insights From A Field Experiment Few studies of silicate mineral weathering have been conducted in carbonate-bearing temperate forest soils. With climate and vegetation held constant, we compared soil mineralogy and major element chemistry of soil waters from a carbonate-free.....		document	2024/11/13
Stabilization Of Recent Soil Carbon In The Humid Tropics Following Land Use Changes: Evidence From		document	2024/11/13

- Microbial Biomass
- Soil Enzyme Activities
- Soil Fauna
- Soil Respiration

Soil Functions

- Soil Fertility
- Water Regulation
- Soil Erosion Control
- Carbon Sequestration
- Soil Health
- Supporting Plant Growth
- Contaminant Filtration

Soil Degradation Indicators

- Soil Erosion
- Soil Compaction
- Soil Salinization
- Soil Acidification
- Soil Contamination

Environmental Soil Functions

- Habitat For Organisms
- Climate Regulation
- Water Filtration

Long-Term Field Experiments

- Experimental Treatments
- Temporal Data
- Environmental Covariates
- Soil Productivity
- Soil Management

Type

- *Dataset* ×

field survey. The spectra were taken at 0.7 to 1.4 m s-1 at 0.3 m above soil surface with an RSI-700.....			
On-the-go gamma spectra for the site "Uckermark-1" from the publication Pätzold et al. 2020, Soil Systems 4, 31 The file contains 11,406 datasets. They comprise gamma-ray data (total counts, K-40, U-238, and Th-232, all in Bq), along with co-ordinates from a field survey. The spectra were taken at 0.7 to 1.4 m s-1 at 0.3 m above soil surface with an RSI-700.....	University of Bonn, Institute of Crop Science and Resource Conservation (INRES) - Soil Science and Soil Ecology, Bonn (Germany), University of Bonn, Institute of Crop Science and Resource Conservation (INRES) - Soil Science and Soil Ecology, Bonn (Germany), Leibniz Centre for Agricultural Landscape Research (ZALF)	dataset	2023/12/01
On-the-go gamma spectra for the site "Rheinbach-2" from the publication Pätzold et al. 2020, Soil Systems 4, 31 The file contains 680 datasets. They comprise gamma-ray data (total counts, K-40, U-238, and Th-232, all in Bq), along with co-ordinates from a field survey. The spectra were taken at 0.7 to 1.4 m s-1 at 0.3 m above soil surface with an RSI-700.....	University of Bonn, Institute of Crop Science and Resource Conservation (INRES) - Soil Science and Soil Ecology, Bonn (Germany), University of Bonn, Institute of Crop Science and Resource Conservation (INRES) - Soil Science and Soil Ecology, Bonn (Germany), Leibniz Centre for Agricultural Landscape Research (ZALF)	dataset	2023/12/01
On-the-go gamma spectra for the site "Uckermark 2" from the publication Pätzold et al. 2020, Soil Systems 4, 31 The file contains 13364 datasets. They comprise gamma-ray data (total counts, K-40, U-238, and Th-232, all in Bq), along with co-ordinates from a field survey. The spectra were taken at 0.7 to 1.4 m s-1 at 0.3 m above soil surface with an RSI-700.....	University of Bonn, Institute of Crop Science and Resource Conservation (INRES) - Soil Science and Soil Ecology, Bonn (Germany), University of Bonn, Institute of Crop Science and Resource Conservation (INRES) - Soil Science and Soil Ecology, Bonn (Germany), Leibniz Centre for Agricultural Landscape Research (ZALF)	dataset	2023/09/12
On-the-go gamma spectra for the site "Düren" from the publication Pätzold et al. 2020, Soil Systems 4, 31 The file contains 3,592 datasets. They comprise gamma-ray data (total counts, K-40, U-238, and Th-232, all in Bq), along with co-ordinates from a	University of Bonn, Institute of Crop Science and Resource Conservation (INRES) - Soil Science and Soil Ecology, Bonn (Germany), University of Bonn, Institute of Crop Science and Resource Conservation (INRES) - Soil Science and Soil Ecology, Bonn (Germany), Leibniz Centre for Agricultural Landscape Research (ZALF)	dataset	2023/12/01

Dataset

On-the-go gamma spectra for the site “Uckermark-1” from the publication Pätzold et al. 2020, Soil Systems 4, 31

The file contains 11,406 datasets. They comprise gamma-ray data (total counts, K-40, U-238, and Th-232, all in Bq), along with co-ordinates from a field survey. The spectra were taken at 0.7 to 1.4 m s-1 at 0.3 m above soil surface with an RSI-700 instrument (two 4.2 L NaI crystals). Further details in the open access publication Pätzold et al. 2020 (https://doi.org/10.3390/soilsystems4020031)

farming | Soil | opendata

soil heterogeneity; proximal soil sensing; on-the-go gamma spectroscopy; grain size distribution; soil mineralogy; variable rate irrigation; liming; plot trial;

Boden

Contacts

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Role: author
Email: s.paetzold@uni-bonn.de
Url:

Pätzold, Stefan
Role: projectLeader
Email: s.paetzold@uni-bonn.de

Links

https://maps.bonares.de/mapapps/...

Narrative : an agroforestry story

Funded by the European Union

This project has received funding from the Horizon Europe research and innovation programme under Grant Agreement **No 101112838**

An agroforestry story

As a researcher in ecophysiology at INRAE, I need to simulate the water and light use efficiencies in agroforestry plots.

For this modeling, I need as input information

the soil water content in %

Funded by the European Union

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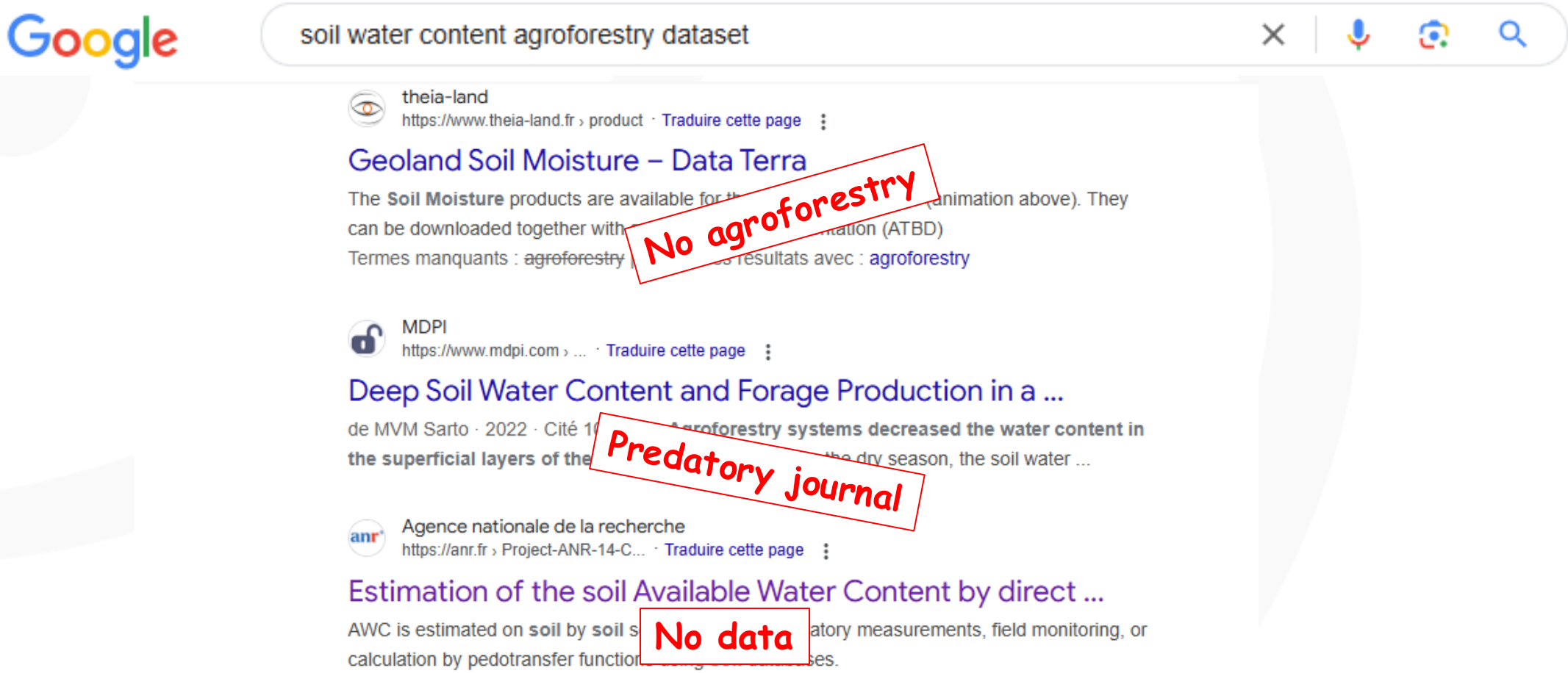
SoilWise KNOWLEDGE & DATA FLOWS

Soil water content data for agroforestry – *Before SoilWise*



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Soil water content data for agroforestry – *Before SoilWise*

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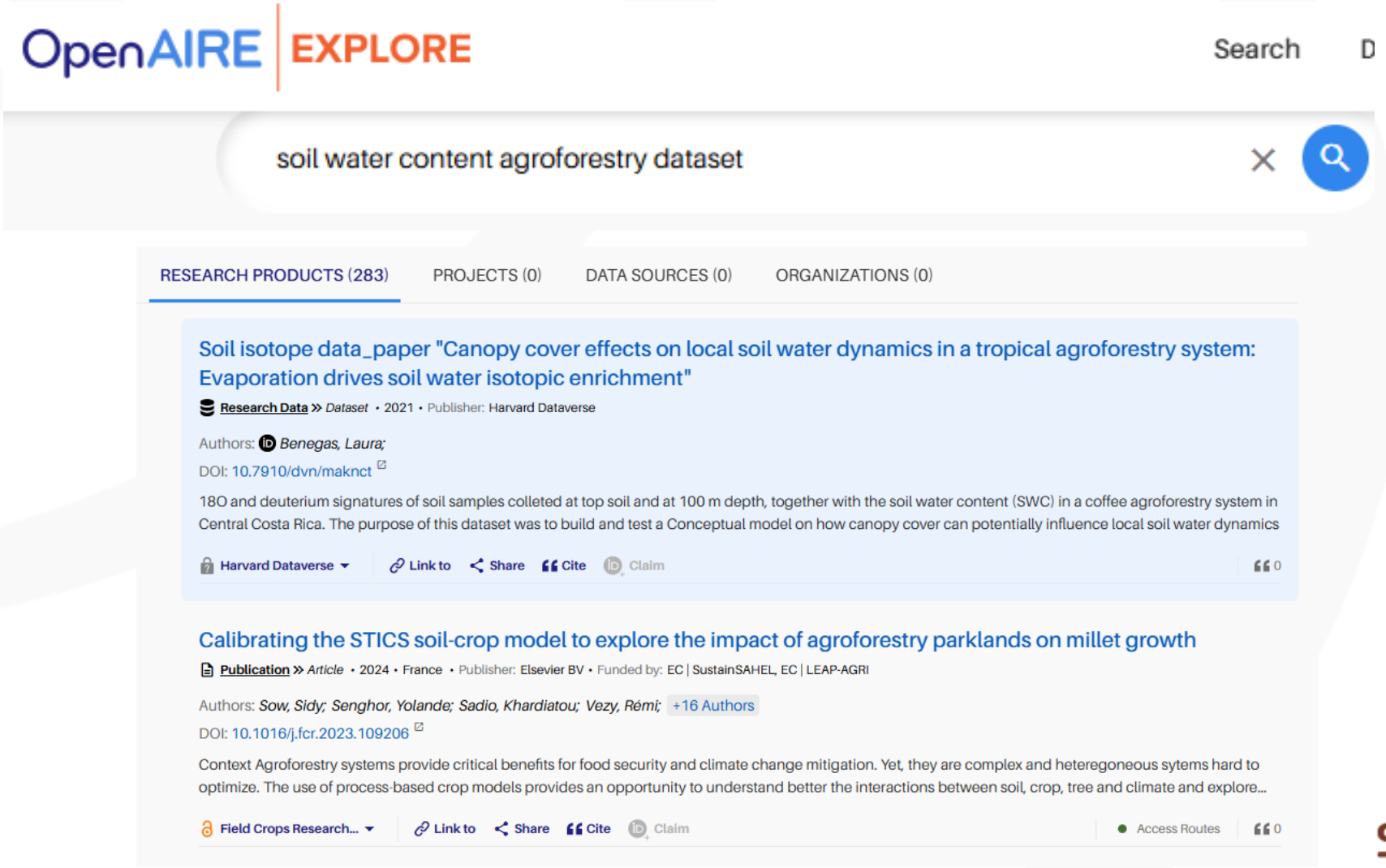
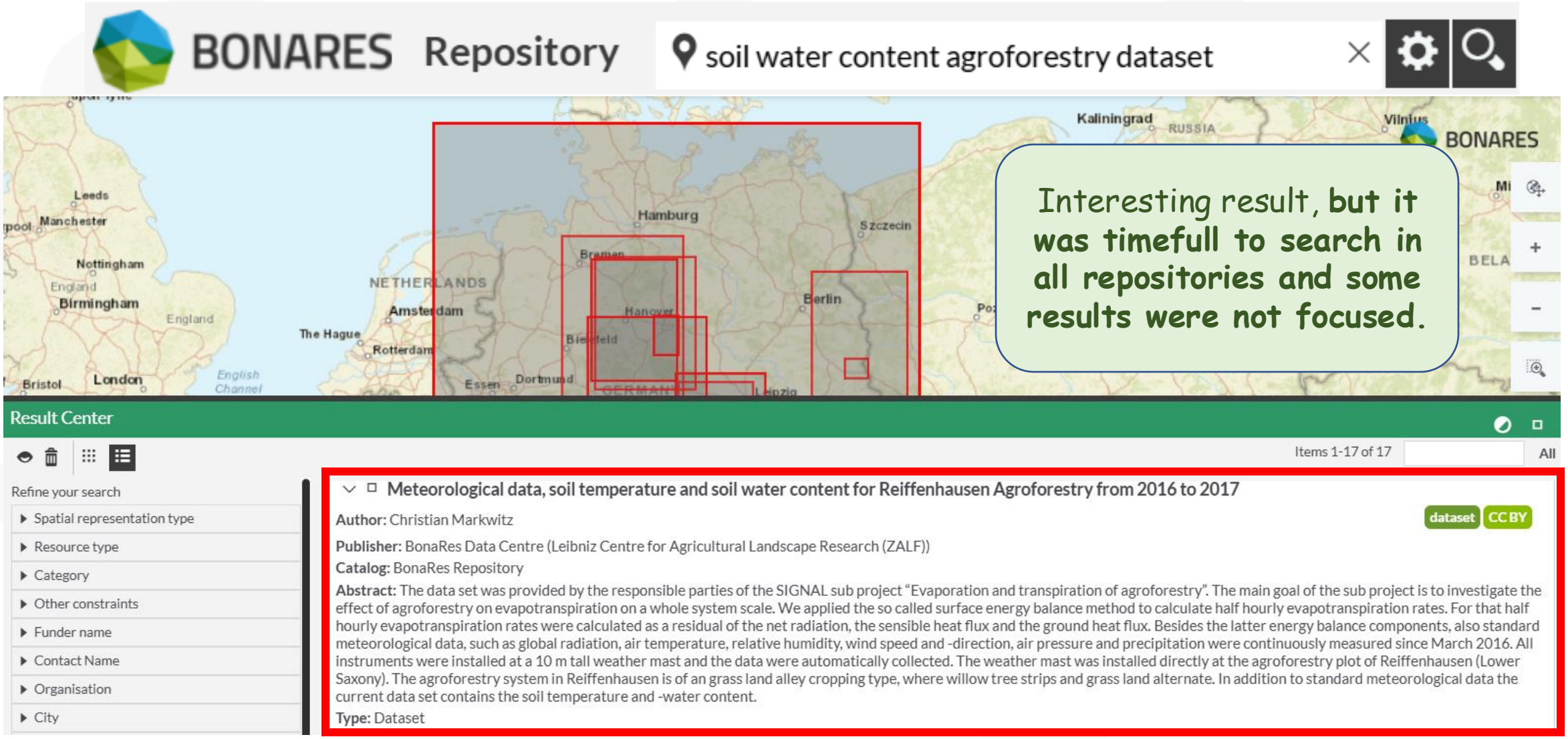
Soil water content data for agroforestry – *Before SoilWise*

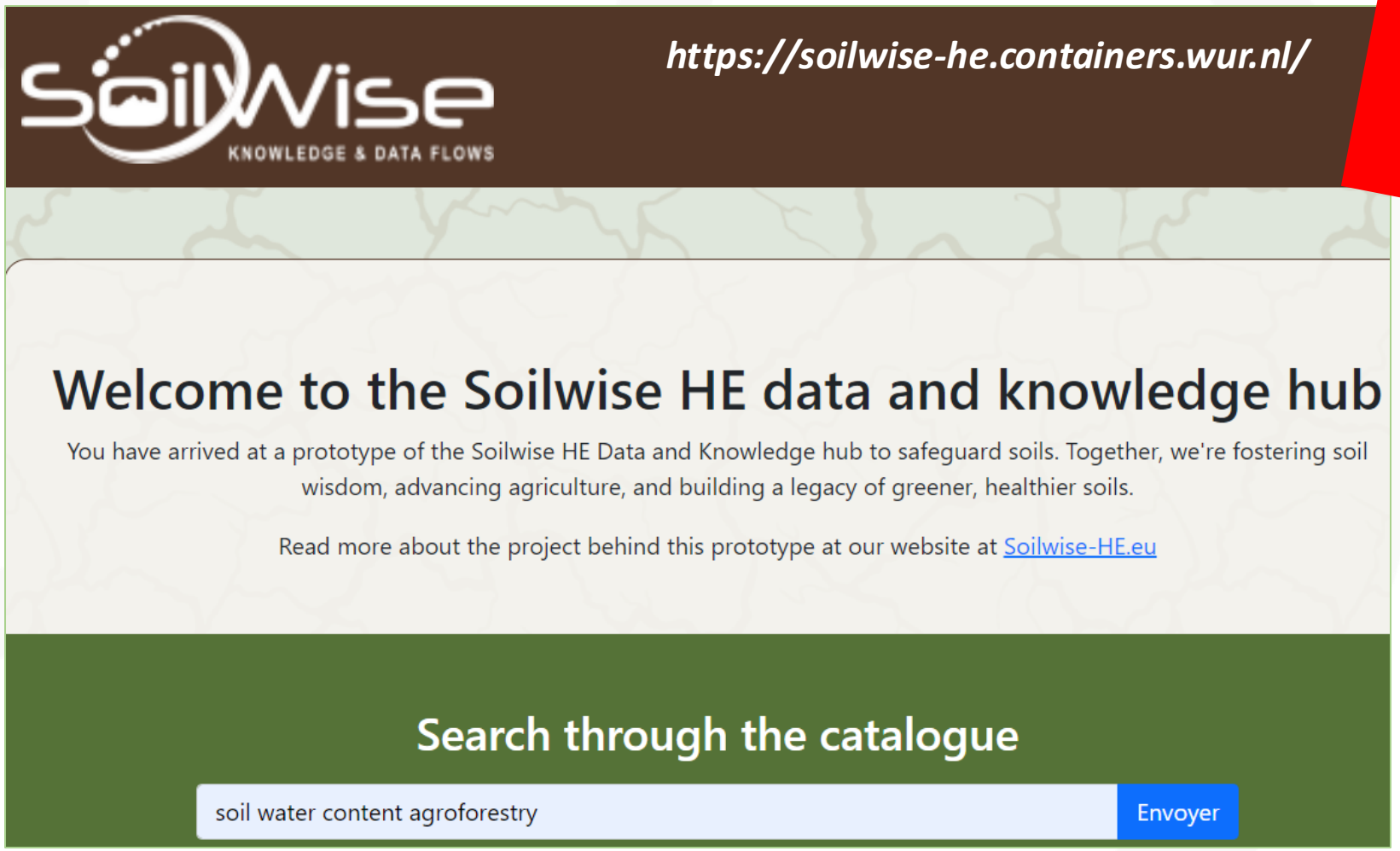


and innovation programme under Grant Agreement No 101112838

Soil water content data for agroforestry – *Before SoilWise*



Soil water content data for agroforestry – *With SoilWise*



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SoilWise KNOWLEDGE & DATA FLOWS

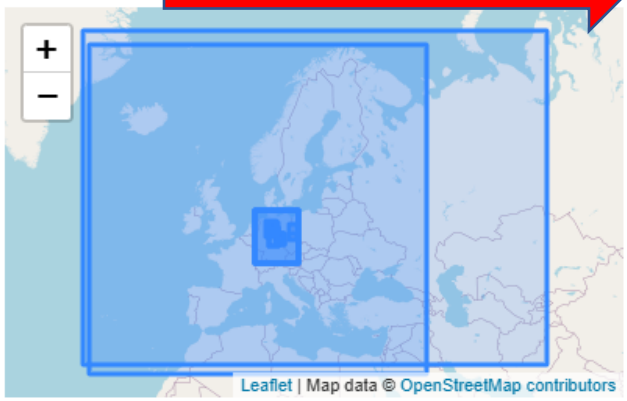
Soil water content data for agroforestry – *With SoilWise*

Functionality Catalogue

Sort by...

soil water content agroforestry Search

44 results.

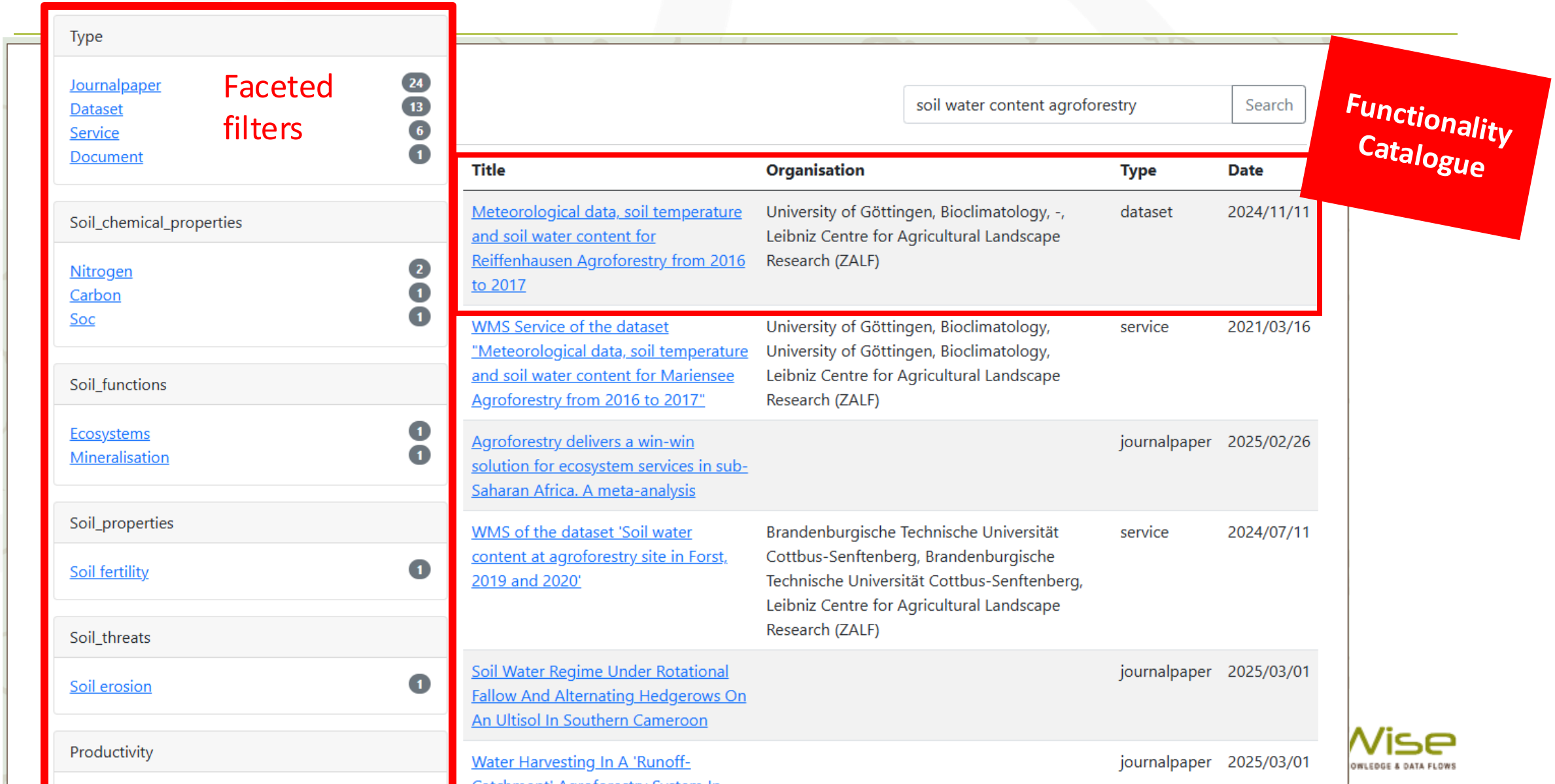


Spatial filter Apply

Facets

Title	Organisation	Type	Date
Meteorological data, soil temperature and soil water content for Reiffenhausen Agroforestry from 2016 to 2017	University of Göttingen, Bioclimatology, -, Leibniz Centre for Agricultural Landscape Research (ZALF)	dataset	2024/11/11
WMS Service of the dataset "Meteorological data, soil temperature and soil water content for Mariensee Agroforestry from 2016 to 2017"	University of Göttingen, Bioclimatology, University of Göttingen, Bioclimatology, Leibniz Centre for Agricultural Landscape Research (ZALF)	service	2021/03/16
Agroforestry delivers a win-win solution for ecosystem services in sub-Saharan Africa. A meta-analysis		journalpaper	2025/02/26
WMS of the dataset 'Soil water content at agroforestry site in Forst, 2019 and 2020'	Brandenburgische Technische Universität Cottbus-Senftenberg, Brandenburgische Technische Universität Cottbus-Senftenberg, Leibniz Centre for Agricultural Landscape Research (ZALF)	service	2024/07/11
Soil Water Regime Under Rotational Fallow And Alternating Hedgerows On An Ultisol In Southern Cameroon		journalpaper	2025/03/04
Water Harvesting In A 'Runoff-		journalpaper	2025/03/04

Soil water content data for agroforestry – *With SoilWise*



Soil water content data for agroforestry – *With SoilWise*

Dataset

Meteorological data, soil temperature and soil water content for Reiffenhausen Agroforestry from 2016 to 2017

The data set was provided by the responsible parties of the SIGNAL sub project "Evaporation and transpiration of agroforestry". The main goal of the sub project is to investigate the effect of agroforestry on evapotranspiration on a whole system scale. We applied the so called surface energy balance method to calculate half hourly evapotranspiration rates. For that half hourly evapotranspiration rates were calculated as a residual of the net radiation, the sensible heat flux and the ground heat flux. Besides the latter energy balance components, also standard meteorological data, such as global radiation, air temperature, relative humidity, wind speed and -direction, air pressure and precipitation were continuously measured since March 2016. All instruments were installed at a 10 m tall weather mast and the data were automatically collected. The weather mast was installed directly at the agroforestry plot of Reiffenhausen (Lower Saxony). The agroforestry system in Reiffenhausen is of an grass land alley cropping type, where willow tree strips and grass land alternate. In addition to standard meteorological data the current data set contains the soil temperature and -water content.

climatologyMeteorologyAtmosphere | meteorological observations | agroforestry | microclimate | soil measurements | soil analysis | global radiation | net radiation | wind speed | relative humidity | wind direction | air temperature | ground heat flux | soil water content | soil temperature | air pressure | precipitation | Atmosphärischer Vorgang | Luftbewegung | Atmosphärische Bedingungen | Boden

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Email: christian.markwitz@forst.uni-goettingen.de
Deliverypoint: Büsgenweg 2
City: Göttingen

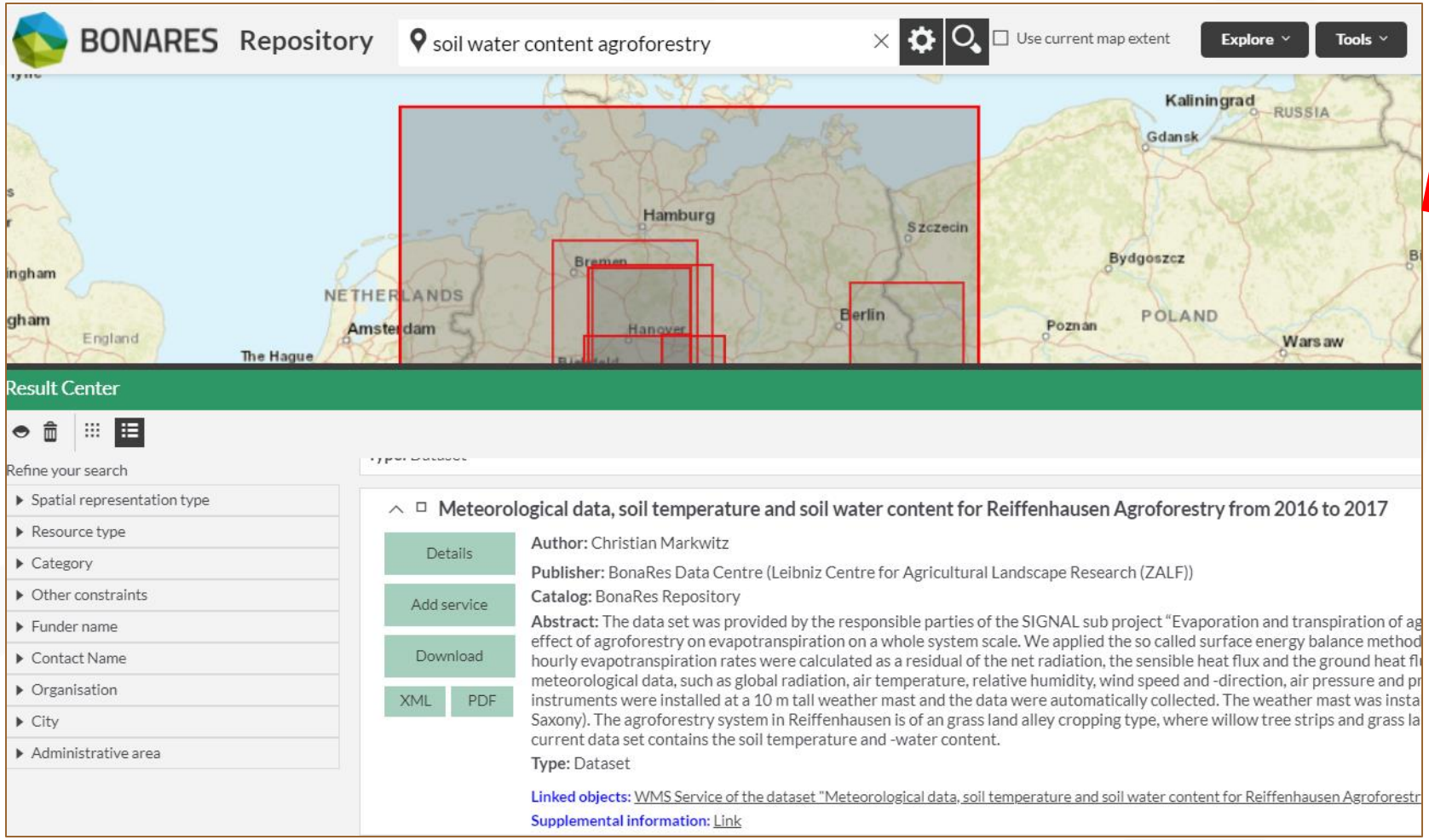
Links

html https://maps.bonares.de/mapapps/... 1.05 KB

Functionality providing search results

Soil water content data for agroforestry – *With SoilWise*

Functionality data download 'as is'



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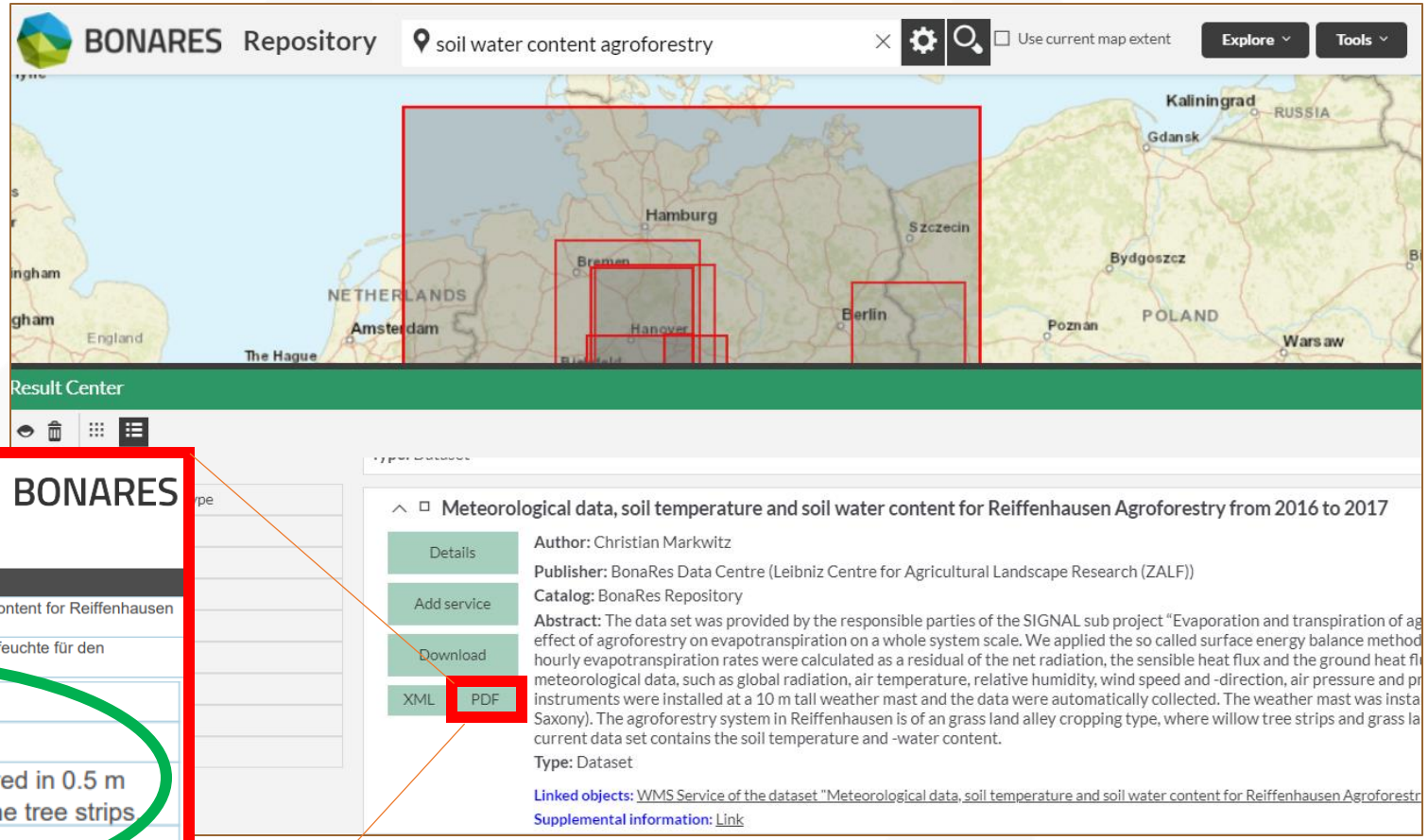
SoilWise KNOWLEDGE & DATA FLOWS

Soil water content data for agroforestry – *With SoilWise*

Check of the metadata (units) :



Bonares Repository

PDF Details View

BONARES

Description	
Title:	Meteorological data, soil temperature and soil water content for Reiffenhausen Agroforestry from 2016 to 2017
Title (German):	Meteorologische Daten, Bodentemperatur und Bodenfeuchte für den Agroforststandort Reiffenhausen von 2016 bis 2017
Column name:	SWC_Perc_z50_4m
Long name:	Soil water content
Description:	Soil water content was measured in 0.5 m depth and at 4 m distance to the tree strips
Unit:	%
Methods:	Soil water content was measured in 0.5 m depth and at 4 m distance to the tree strips.
Quality:	Outlier removed and not gap-filled
Data type:	numeric

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SoilWise KNOWLEDGE & DATA FLOWS

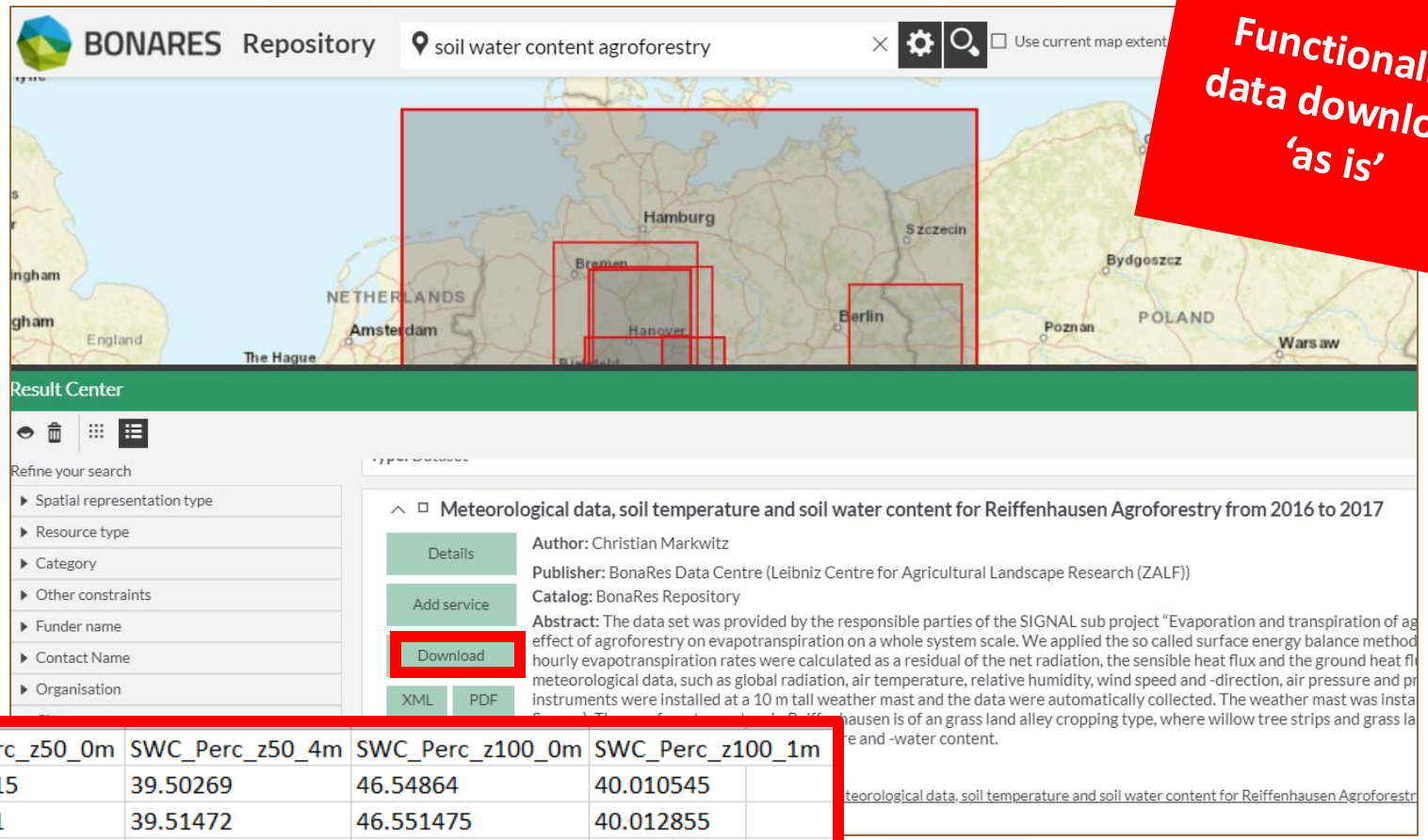
Soil water content data for agroforestry – *With SoilWise*

Download of data :

Soil water content in %, at different depth and distances from the tree lines

Time

SWC_Perc_z30_1m	SWC_Perc_z30_4m	SWC_Perc_z50_0m	SWC_Perc_z50_4m	SWC_Perc_z100_0m	SWC_Perc_z100_1m
35.7029	36.628325	48.598015	39.50269	46.54864	40.010545
35.72367	36.668275	48.61131	39.51472	46.551475	40.012855
35.68747	36.54648	48.65459	39.535865	46.55359	40.00477
35.716255	36.594485	48.614395	39.5268	46.534	40.02503
35.697445	36.603985	48.59386	39.50731	46.5442	40.00546
35.69685	36.574905	48.6032	39.526105	46.54335	40.01454
35.715615	36.622265	48.592875	39.516305	46.522835	40.024275



Functionality data download 'as is'

and innovation programme under Grant Agreement No 101112838

Soil water content data for agroforestry

Now that I have my **new data** :

OBJE	lat_deg	lon_deg	Date_YYYYmr	T_degC	RH_Perc	Rn_W_m2	G_W_m2	rain_n	WS_m_s	T_Soil_degC_	SWC_Perc_z30_1m	SWC_Perc_z30_4m	SWC_Perc_z50_0m	SWC_Perc_z50_4m	SWC_Perc_z100_0m	SWC_Perc_z100_1m
1	51.3989	9.98712	2016-03-01T0	-1.33732	75.009722	-56.84727	-7.592705	0	1.919708	2.7958995	35.7029	36.628325	48.598015	39.50269	46.54864	40.010545
2	51.3989	9.98712	2016-03-01T0	-1.81382	78.979888	-44.13033	-7.585438	0	1.431261	2.7927845	35.72367	36.668275	48.61131	39.51472	46.551475	40.012855
3	51.3989	9.98712	2016-03-01T0	-1.71470	79.408944	-23.63116	-7.541722	0	1.256810	2.786562	35.68747	36.54648	48.65459	39.535865	46.55359	40.00477

I need to compare it to an **old data** having a different format :

LAT_deg	LONG_deg	Date_hours	SWC_Perc_z50_4m	SWC_Ratio_z50_0m
51.398939	9.987122	2015-03-01T0	47.61131	39.124
51.398940	9.987123	2015-03-01T0	46.293015	38.9658
51.398941	9.987124	2015-03-01T0	46.53759	38.23725
51.398942	9.987125	2015-03-01T0	47.512395	39.1724

Funded by the European Union

This project has received funding from the Horizon Europe research and innovation programme under Grant Agreement No 101112838

SoilWise KNOWLEDGE & DATA FLOWS

Soil water content data for agroforestry

So I need to transform my **new data format** :

OBJE	lat_deg	lon_deg	Date_YYYYmr	T_degC	RH_Perc	Rn_W_m2	G_W_m2	rain_n	WS_m_s	T_Soil_degC_	SWC_Perc_z30_1m	SWC_Perc_z30_4m	SWC_Perc_z50_0m	SWC_Perc_z50_4m	SWC_Perc_z100_0m	SWC_Perc_z100_1m
1	51.3989	9.98712	2016-03-01T0	-1.33732	75.009722	-56.84727	-7.592705	0	1.919708	2.7958995	35.7029	36.628325	48.598015	39.50269	46.54864	40.010545
2	51.3989	9.98712	2016-03-01T0	-1.81382	78.979888	-44.13033	-7.585438	0	1.431261	2.7927845	35.72367	36.668275	48.61131	39.51472	46.551475	40.012855
3	51.3989	9.98712	2016-03-01T0	-1.71470	79.408944	-23.63116	-7.541722	0	1.256810	2.786562	35.68747	36.54648	48.65459	39.535865	46.55359	40.00477

in the **old data format** :

LAT_deg	LONG_deg	Date_hours	SWC_Perc_z50_4m	SWC_Ratio_z50_0m
51.398939	9.987122	2015-03-01T0	47.61131	39.124
51.398940	9.987123	2015-03-01T0	46.293015	38.9658
51.398941	9.987124	2015-03-01T0	46.53759	38.23725
51.398942	9.987125	2015-03-01T0	47.512395	39.1724

To obtain this **transformed data** :

LAT_deg	LONG_deg	Date_hours	SWC_Perc_z50_4m	SWC_Ratio_z50_0m
51.398939	9.987122	2016-03-01T0	48.61131	39.44728
51.398940	9.987123	2016-03-01T0	48.598015	39.47648
51.398941	9.987124	2016-03-01T0	48.65459	39.43775
51.398942	9.987125	2016-03-01T0	48.614395	39.43758

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SoilWise KNOWLEDGE & DATA FLOWS

Soil water content data for agroforestry

So I need to transform my **new data format** :

OBJE	lat_deg	lon_deg	Date_YYYYmr	T_degC	RH_Perc	Rn_W_m2	G_W_m2	rain_n	WS_m_s	T_Soil_degC_	SWC_Perc_z30_1m	SWC_Perc_z30_4m	SWC_Perc_z50_0m	SWC_Perc_z50_4m	SWC_Perc_z100_0m	SWC_Perc_z100_1m
1	51.3989	9.98712	2016-03-01T0	-1.33732	75.009722	-56.84727	-7.592705	0	1.919708	2.7958995	35.7029	36.628325	48.598015	39.50269	46.54864	40.010545
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in the **old data format** :

LAT_deg	LONG_deg	Date_hours	SWC_Perc_z50_4m	SWC_Ratio_z50_0m
51.398939	9.987122	2015-03-01T0	47.61131	39.124
51.398940	9.987123	2015-03-01T0	46.293015	38.9658
51.398941	9.987124	2015-03-01T0	46.53759	38.23725
51.398942	9.987125	2015-03-01T0	47.512395	39.1724

« Target metadata schema »

To obtain this **transformed data** :

LAT_deg	LONG_deg	Date_hours	SWC_Perc_z50_4m	SWC_Ratio_z50_0m
51.398939	9.987122	2016-03-01T0	48.61131	39.44728
51.398940	9.987123	2016-03-01T0	48.598015	39.47648
51.398941	9.987124	2016-03-01T0	48.65459	39.43775
51.398942	9.987125	2016-03-01T0	48.614395	39.43758

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SoilWise KNOWLEDGE & DATA FLOWS

Soil water content data for agroforestry

So I need to transform my **new data format** :

OBJE	lat_deg	lon_deg	Date_YYYYmr	T_degC	RH_Perc	Rn_W_m2	G_W_m2	rain_n	WS_m_s	T_Soil_degC_	SWC_Perc_z30_1m	SWC_Perc_z30_4m	SWC_Perc_z50_0m	SWC_Perc_z50_4m	SWC_Perc_z100_0m	SWC_Perc_z100_1m
1	51.398	9.9871	2016-03-01T0	-1.33732	75.009722	-56.84727	-7.592705	0	1.919708	2.7958995	35.7029	36.628325	48.598015	39.50269	46.54864	40.010545
2	51.398	9.9871	2016-03-01T0	-1.81382	78.979888	-44.13033	-7.585438	0	1.431261	2.7927845	35.72367	36.668275	48.61131	39.51472	46.551475	40.012855
3	51.398	9.9871	2016-03-01T0	-1.71470	79.408944	-23.63116	-7.541722	0	1.256810	2.786562	35.68747	36.54648	48.65459	39.535865	46.55359	40.00477

« Source data (and metadata schema) »

in the **old data format** :

Unit conversion % → ratio

LAT_deg	LONG_deg	Date_hours	SWC_Perc_z50_4m	SWC_Ratio_z50_0m
51.398939	9.987122	2015-03-01T0	47.61131	39.124
51.398940	9.987123	2015-03-01T0	46.293015	38.9658
51.398941	9.987124	2015-03-01T0	46.53759	38.23725
51.398942	9.987125	2015-03-01T0	47.512395	39.1724

To obtain this **transformed data** :

LAT_deg	LONG_deg	Date_hours	SWC_Perc_z50_4m	SWC_Ratio_z50_0m
51.398939	9.987122	2016-03-01T0	48.61131	Ratio
51.398940	9.987123	2016-03-01T0	48.598015	
51.398941	9.987124	2016-03-01T0	48.65459	
51.398942	9.987125	2016-03-01T0	48.614395	

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SoilWise KNOWLEDGE & DATA FLOWS

Soil water content data for agroforestry

I usually program a script for this operation, but I can use Hale Studio, there will be less coding.

https://wetransform.to/halestudio

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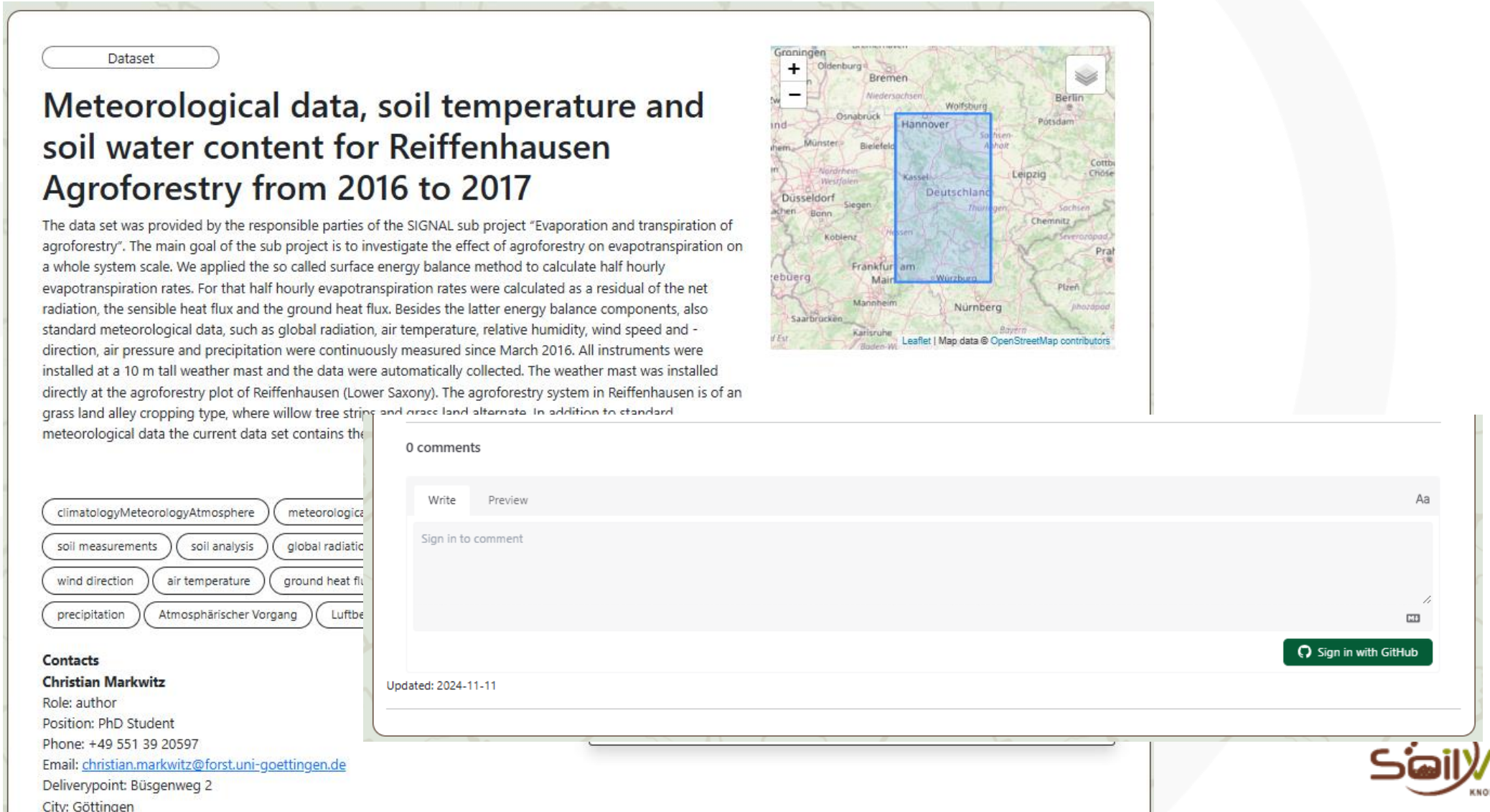
SoilWise KNOWLEDGE & DATA FLOWS

How can you comment?



Interactive discussion on enhancing the prototype's usefulness for users, and metadata

Fenny van Egmond ISRIC, Celine Blitz-Frayret CIRAD, Radu Giurgiu EV-ILVO, Tomas Reznik MU, Paul van Genuchten ISRIC, Panos Ilias EV-ILVO

User stories

Please go to the **flip charts** on the wall

- **Discuss** with each other (e.g. per topic group?)
- **Write down 2** typical data or information questions from your project or everyday work, each
- In this **format**:

As an <actor>,

I want to have/be able to <function>,

so that I can/don't have to <business reason>.

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SoilWise KNOWLEDGE & DATA FLOWS

How to resolve the user stories currently?

- For the user stories you just wrote down, add another post-it describing **how you would approach this question now**

- And add a V or an X, if that is **satisfactory** or not

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SoilWise KNOWLEDGE & DATA FLOWS

An ideal world

- For the user stories you just wrote down, add another post-it describing how, in an **ideal world**, you would like to have your information question solved
  - How do you want to **interact** with a system, what do you supply?
  - And what (and in what level of detail, or characteristics) do you **expect back** from the system?

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SoilWise KNOWLEDGE & DATA FLOWS

Quick wins

Between an ideal world and real life (the current state of the art) there may be a **gap**.

- What are the quick wins you think a **project** like SoilWise (or your own data team/WP) should **focus** on to make your life easier?

- What can you do **yourself** to make your and others' data life easier?

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SoilWise KNOWLEDGE & DATA FLOWS

Report back

- Per flip-chart group

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SoilWise KNOWLEDGE & DATA FLOWS

Soil Companion

Rob Knapen
Wageningen Environmental Research

Using a LLM to answer questions in natural language

"LLMs are the cherry on the cake,

the cake being a curated database of knowledge."

- Large Language Models (LLM) or ChatGPT type models offer great opportunities for generating answers to (natural language) user queries
- There are also some disadvantages
  - Training cut off date
  - Broadly oriented and less focused on soil health
  - Tendency to "hallucinate" and be generic

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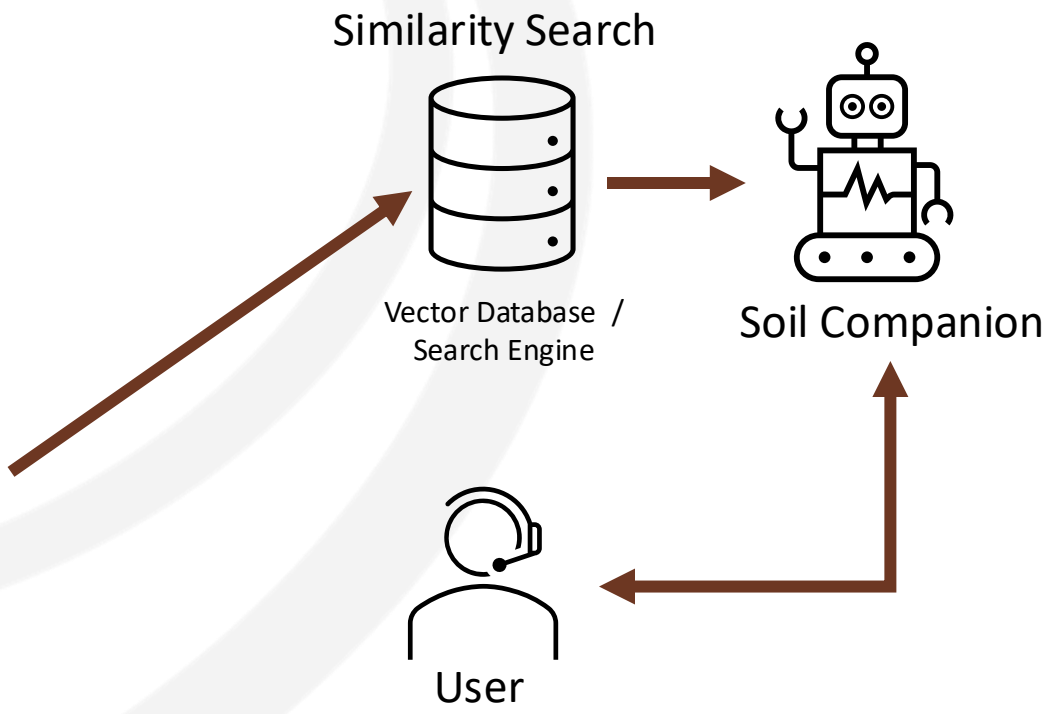
SoilWise KNOWLEDGE & DATA FLOWS

Current SoilWise Chatbot prototype

- docs
  - all
    - Common criteria for risk area identification according to soil threats (European Soil Bureau; 2006).pdf
    - D2.1_ADS_Governance-and-Business-Models.pdf
    - D2.2_ADS_Legislation-and-ethical-principles.pdf
    - D3.1_ADS_Technical-requirements.pdf
    - D3.2_ADS_Reference-Architecture-.pdf
    - dataspecification_so.pdf
    - Derivation methods of soil screening values in Europe (European Commission; 2007).pdf
    - EN - Sealing Guidelines.pdf
    - ENV_Vol-I_Final2_web.pdf
    - Evaluation of expenditure and jobs for addressing soil contamination in Member States (Ernst & Young; 2013).pdf
    - Evaluation of soil protection aspects in certain programmes of measures adopted by Member States (ahu AG Wasser-Boden-Ge
    - GS SOIL_D2.3_Theme catalogue_final.pdf
    - GS SOIL_D2.4 Final_content_IPR_Assessment.pdf
    - GS SOIL_D2.5 Content Framework BPG.pdf
    - GS SOIL_D3.1_Dataset_metadata_profile.pdf
    - GS SOIL_D3.2_Services_metadata_profile.pdf
    - GS SOIL_D3.4_Metadata_BPG.pdf
    - GS SOIL_D4.1_Theme_specific_test_cases.pdf
    - GS SOIL_D4.2_Generic_application_schema.pdf
    - GS SOIL_D4.3_Annex_Testcase_AT.pdf
    - GS SOIL_D4.3_Annex_Testcase_BG.pdf
    - GS SOIL_D4.3_Annex_Testcase_Celtic.pdf
    - GS SOIL_D4.3_Annex_Testcase_FI.pdf
    - GS SOIL_D4.3_Annex_Testcase_GR.pdf
    - GS SOIL_D4.3_Annex_Testcase_HU.pdf
    - GS SOIL_D4.3_Annex_Testcase_SI.pdf
    - GS SOIL_D4.3_Annex_Testcase_SK.pdf
    - GS SOIL_D4.3_Data_Harmonization_BPG.pdf
    - Inventory and Assessment of Soil Protection Policy Instruments in EU Member States (Ecologic Institute, 2017).pdf
    - isric_report_2014_01.pdf
    - Land as a resource - Problem definition and possible areas for EU action (BIO by Deloitte; 2015).pdf
    - landmark-data-warehouse.pdf
    - OWL 2 Web Ontology Language Document Overview (Second Edition).pdf
    - RDF Schema 1.1.pdf
    - Report on best practices for limiting soil sealing and mitigating its effects (Environment Agency Austria; 2011).pdf
    - Review of existing information on the interrelations between soil and climate change (Alterra Wageningen UR; 2008).pdf
    - Scoping study on the International Year of Soils 2015 (Public Relations Communication Strategy SPRL; 2014).pdf
    - SDG Land BrochureSept2020_EN_v3.pdf
    - Soil and water in a changing environment (BIO Intelligence Service; 2014).pdf
    - Soil biodiversity - functions, threats and tools for policy makers (BIO Intelligence Service, 2010).pdf
    - Soil organic matter management across the EU – best practices, constraints and trade-offs (VITO; 2011).pdf
    - Soil Protection - The story behind the Strategy (European Commission; 2006).pdf
    - Soil_Report TH-AL-22-018-EN-N.pdf
    - SPARQL 1.1 Query Language.pdf
    - Study_supporting_potential_land_targets_under_the_2014_land_communication_(BIO_by_Deloitte;_2014).html
    - WENR-rapport 3032_Totaal_LR.pdf



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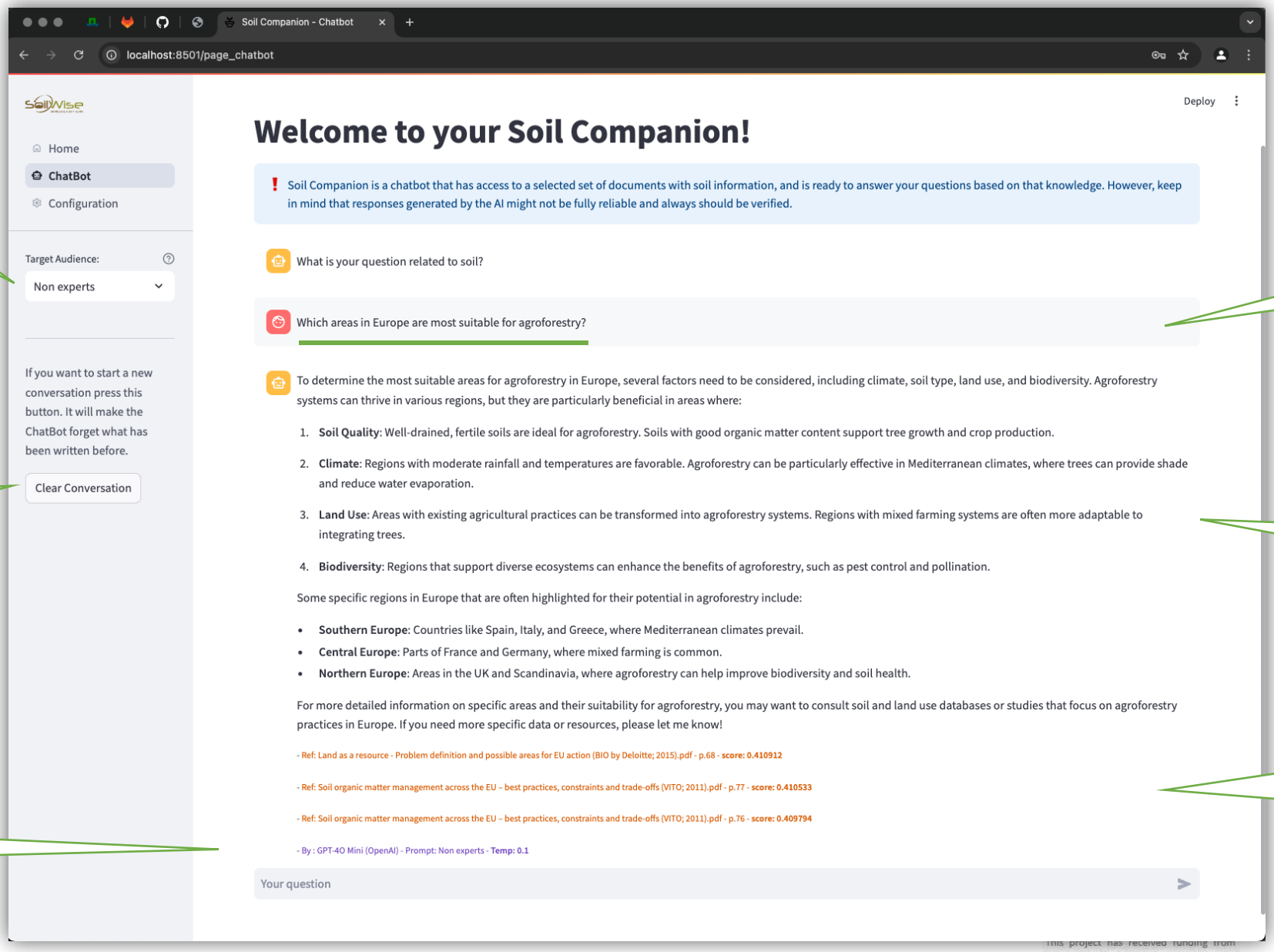
SoilWise KNOWLEDGE & DATA FLOWS



Adjusts writing style

Erases the chatbot's memory

LLM 'author' information

Your questions about soil

Response from the chatbot

Referemces from SoilWise (harvested) knowledge base

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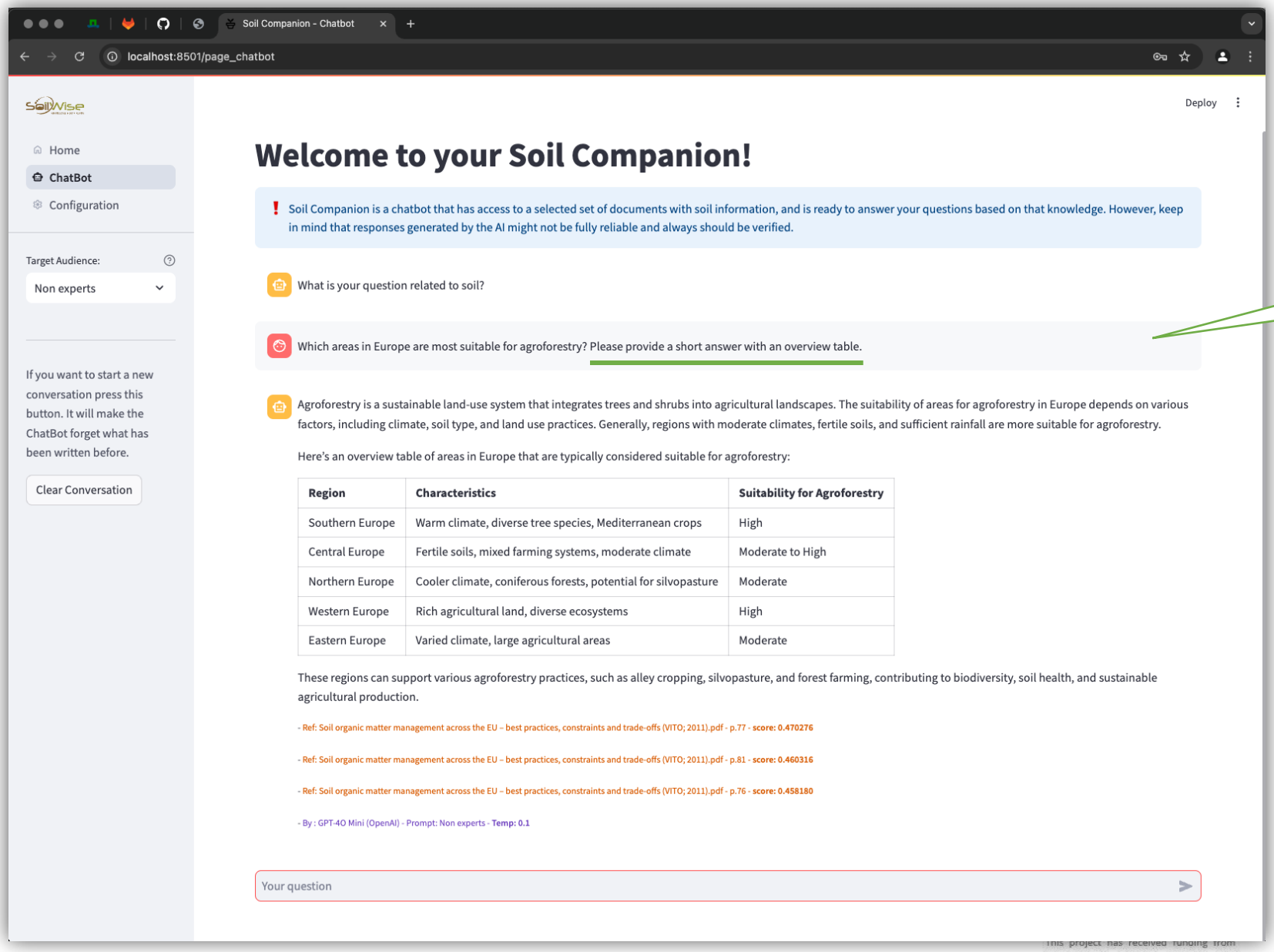
SoilWise KNOWLEDGE & DATA FLOWS



Provide hints and instructions

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SoilWise KNOWLEDGE & DATA FLOWS

To close the meeting

www.menti.com code: 1939 3017

SoilWise social media accounts
Website: soilwise-he.eu

Search: SoilWise Project

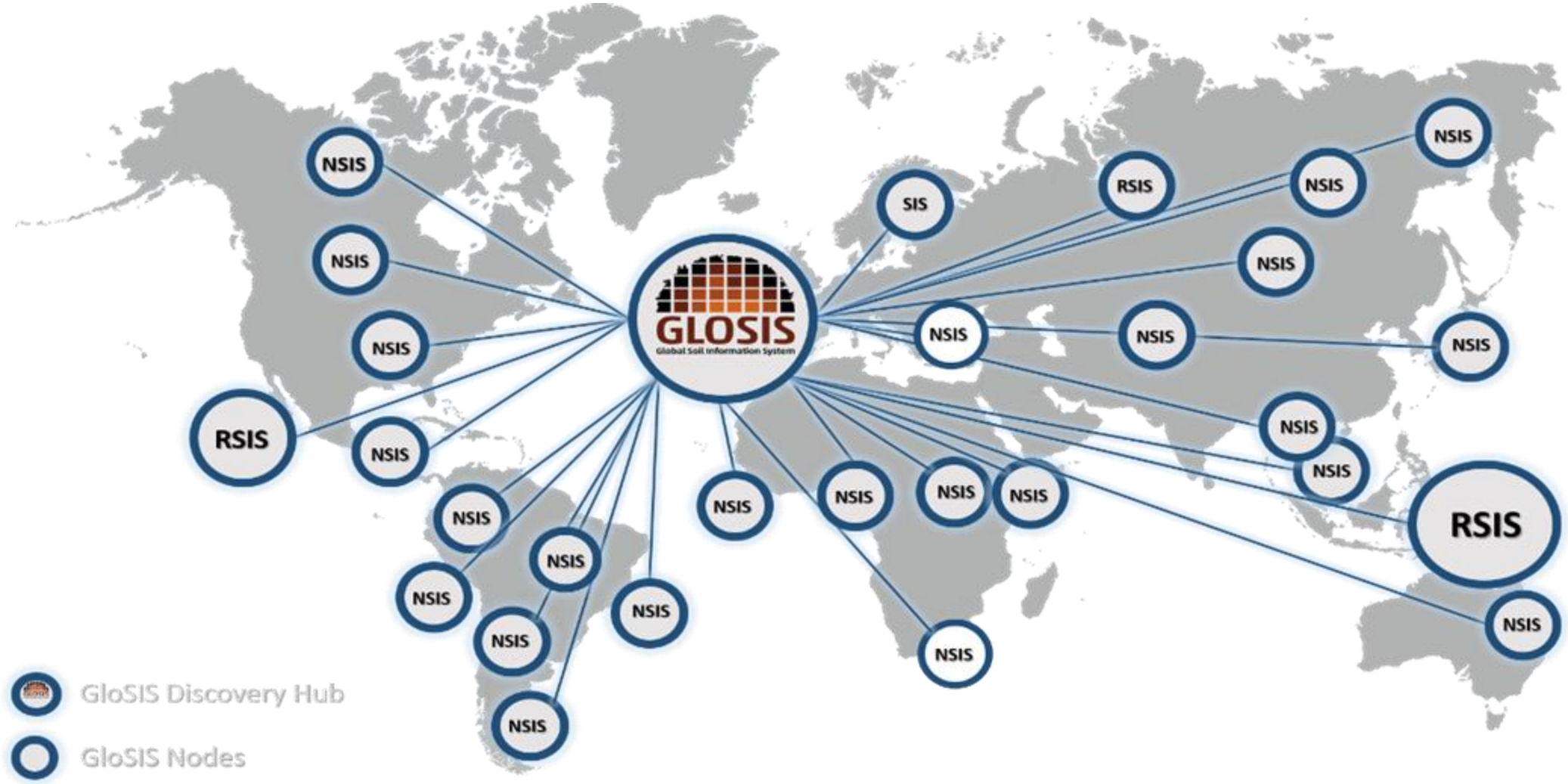
SoilWise Project

@SoilWiseproject

Thank you so much for attending!

Time for the Closing Session

Working together, facilitating dedicated national systems



GLOBAL SOIL PARTNERSHIP

Agenda - Cluster on Data and Knowledge Management (session 2) 14.00-16.30

Cluster on Data and Knowledge Management (session 2): The SoilWise Prototype – A showcase for different users

- Ice-breaker exercise: who is in the room? – Fenny van Egmond (SoilWise)
- Introduction to finding (FAIR) data: the SoilWise repository - Fenny van Egmond and Celine Blitz-Frayret (SoilWise)
    - MRV data question
    - Use case 'An agroforestry story'
    - Future outlook - Soil Companion
- Interactive discussion on enhancing the prototype's usefulness for users and metadata - Fenny van Egmond, Celine Blitz-Frayret, Radu Giurgiu, Tomáš Řezník, Paul van Genuchten, Panos Ilias (SoilWise)

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SoilWise KNOWLEDGE & DATA FLOWS

SoilWise
KNOWLEDGE & DATA FLOWS

Mentimeter

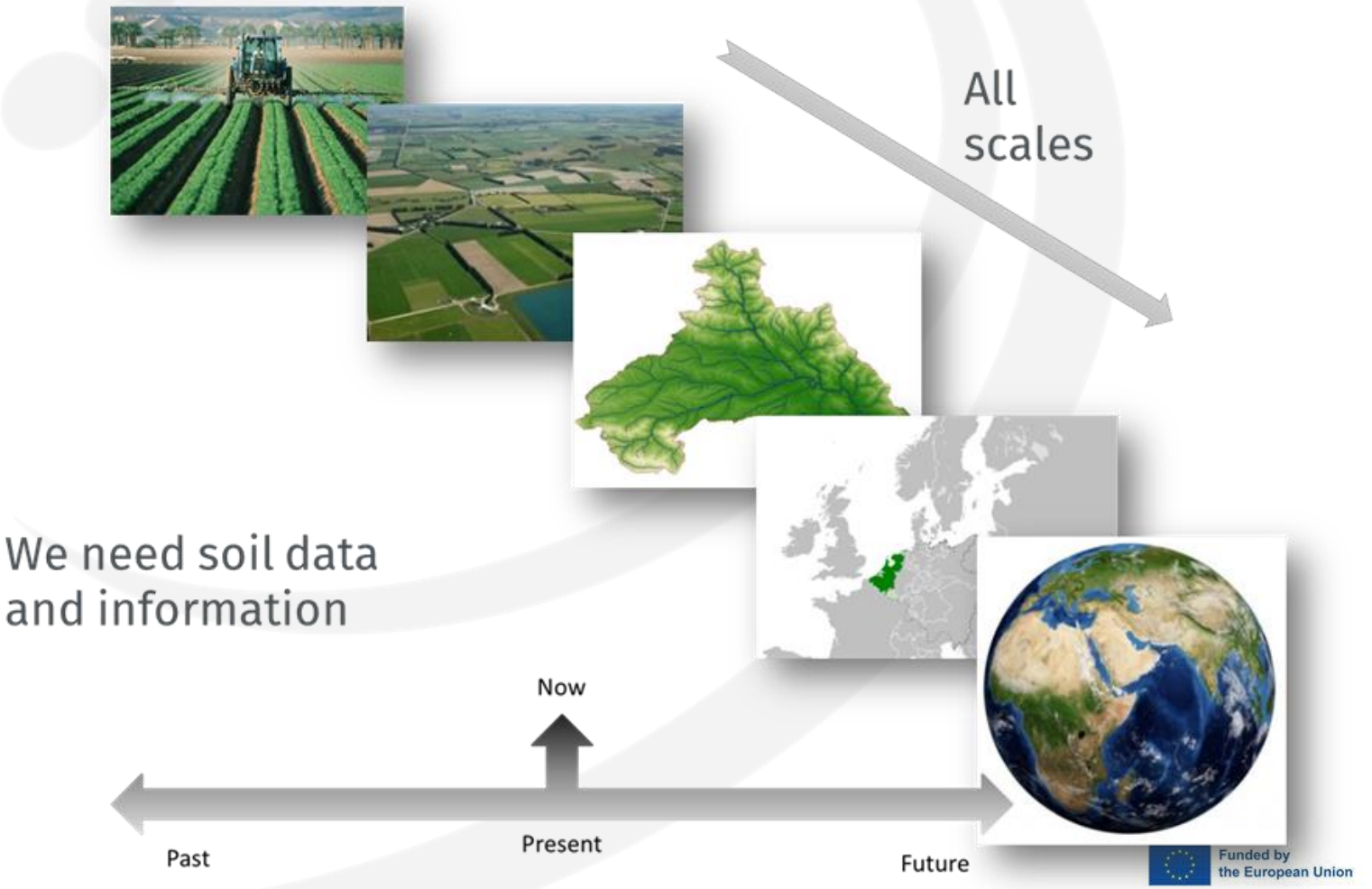
Icebreaker:
Who is in the room?

www.menti.com code: 1939 3017

Introduction to finding FAIR data - the SoilWise repository

Fenny van Egmond ISRIC, Celine Blitz-Frayret CIRAD, Radu Giurgiu EV-ILVO, Tomáš Řezník MU, Paul van Genuchten ISRIC and the entire SoilWise team

Data needs



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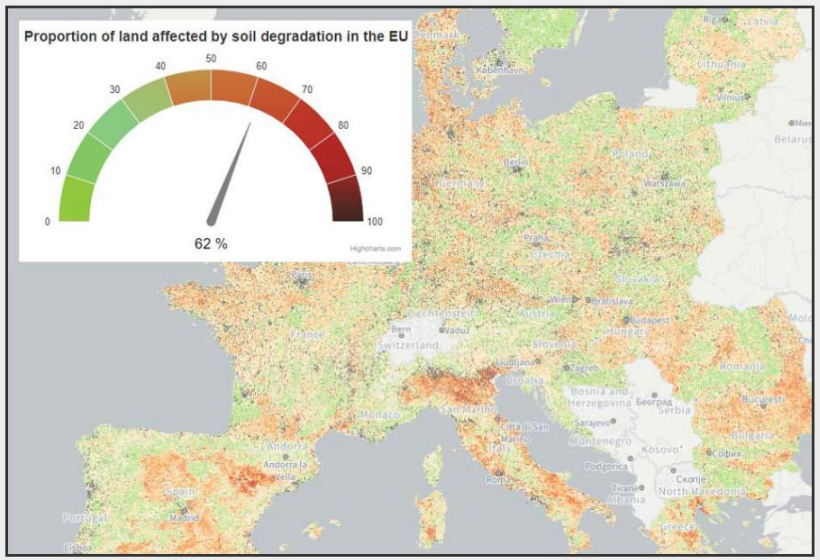
SoilWise
KNOWLEDGE & DATA FLOWS

Why use additional data and knowledge?

The Mission Soil Projects are (also) **data/knowledge users**.



Soil degradation in the EU

Because:

- ✓ Find data and knowledge to supplement your own
- ✓ Answer more research questions in the same time
- ✓ Answer questions that a single project or expertise cannot by itself : collaboration in Mission Soil Clusters
- ✓ Contribute to the Mission Soil Objectives
- ✓ Have long term impact with improved results
- ✓ Improve Soil health in Europe!

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SoilWise KNOWLEDGE & DATA FLOWS

Optimal usage scenario

- Find the data
- Access the data at a web address or via a contact point
- Get the data in a harmonized format, structure, methods (interoperability), either automatically or else based on proper metadata
- Reuse the data

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SoilWise KNOWLEDGE & DATA FLOWS

Real life

- Try to imagine it is not always easy for data providers to provide easily accessible, usable data soil data & knowledge
- Lack of standardised, accessible data
- Findability challenge
- Fragmentation
- Data reusability
- Inefficiencies

=

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SoilWise KNOWLEDGE & DATA FLOWS

And why is that a problem?

- Billions of euros are invested in research on the **assumption it is adding to the knowledge base** towards improving soil health
- Research isn't always used or built on beyond the lifetime of funded projects – **research is done over and over again** – wasting time and resources.
- Earlier investments are made **without necessarily requiring good practice or penalizing a lack of good practice** in data management and sharing in the contractual agreements

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CABI

SoilWise KNOWLEDGE & DATA FLOWS

What is FAIR data?

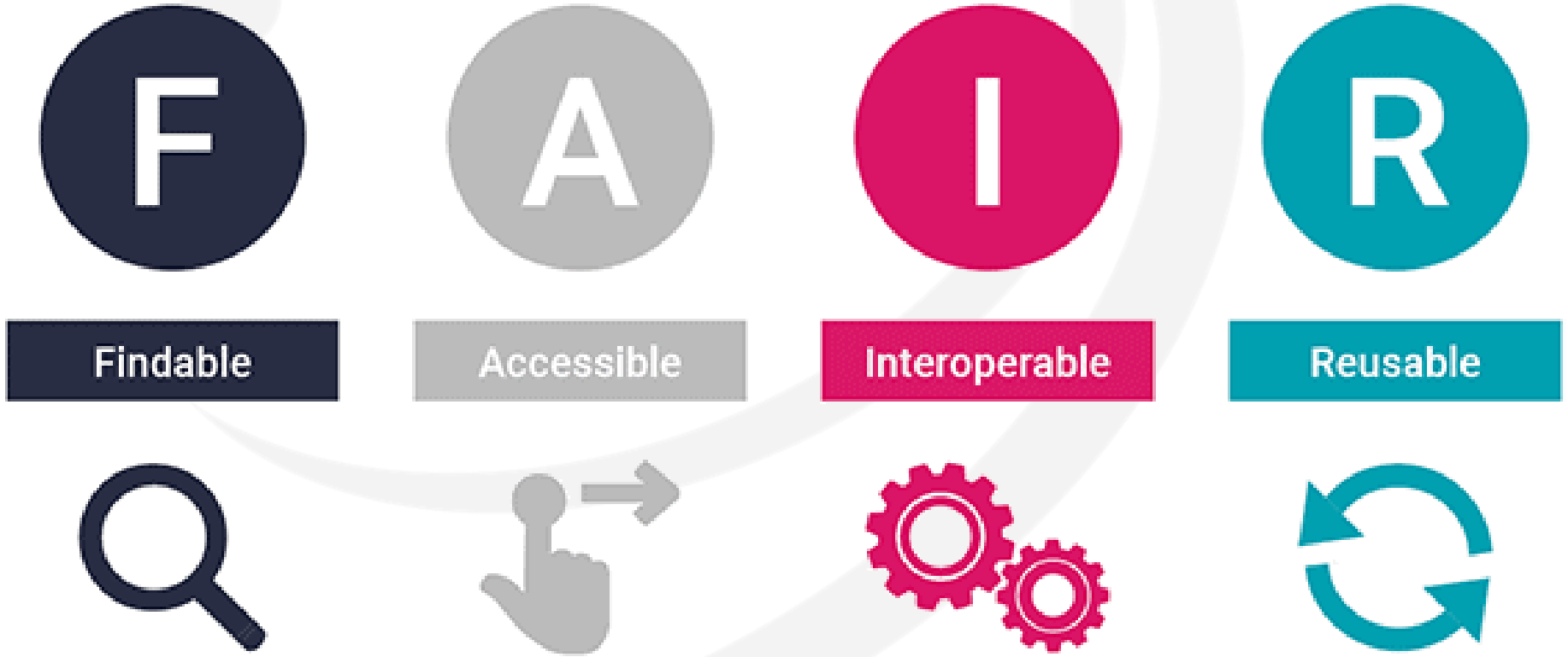

Image adopted from: http://biosistemika.com

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SoilWise KNOWLEDGE & DATA FLOWS

Benefits of FAIR data

- Increased efficiency
- Increases innovation
- Cost savings

<u>0.1-1.5% of GDP in socio-economic benefits</u>

OECD: Data access and sharing can generate socio-economic benefits worth between 0.1% and 1.5% of GDP for public sector data and 1% to 2.5% for private sector data.

<u>$796.0B investment generated</u>

Human Genome Project: investment in making available well-structured data generated $796 billion in economic impact and created approximately 310,000 jobs, driving the genomic revolution.

<u>£10.2B could be saved</u>

EU: Implementing FAIR data principles could save a minimum of £10.2 billion annually by reducing inefficiencies.

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CABI

SoilWise KNOWLEDGE & DATA FLOWS

SoilWise aims to support the EUSO with evidence on soil data and knowledge in Europe

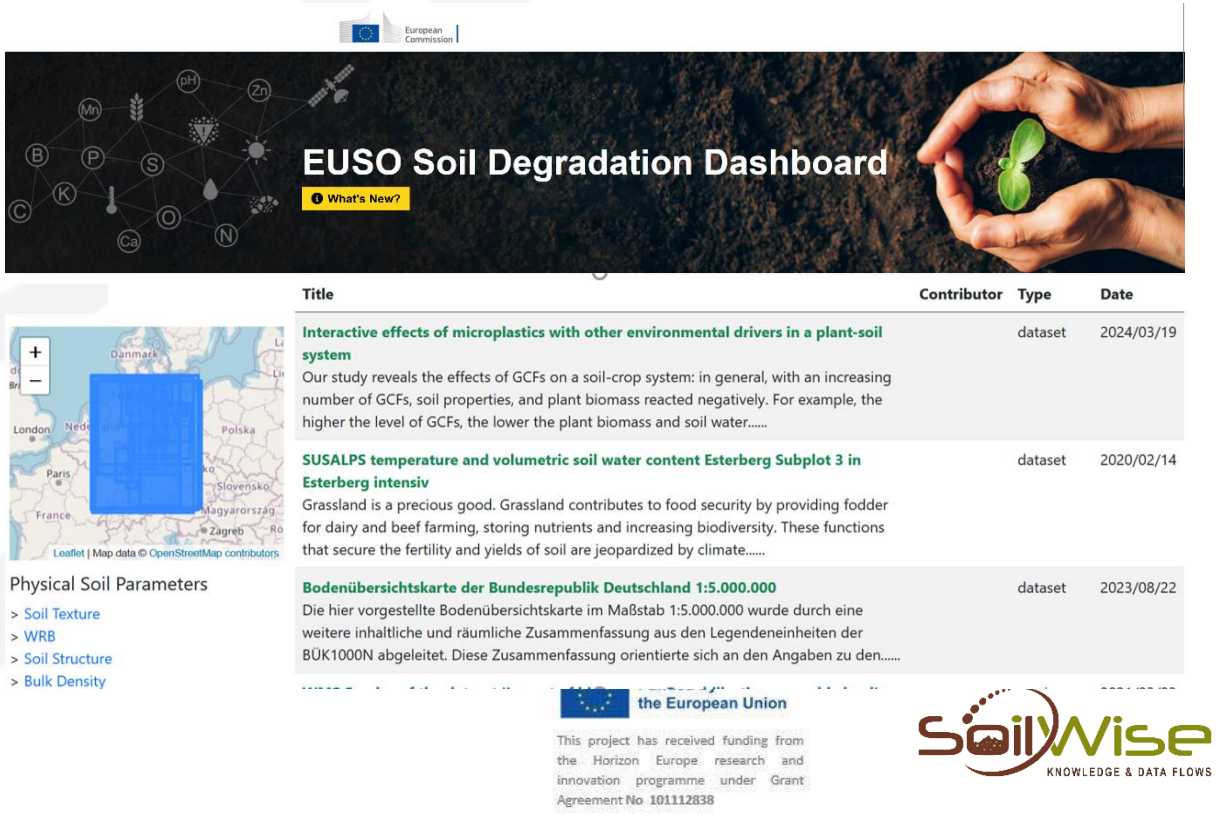
Status quo:

Soil data and knowledge islands with some bridges between them

Images adopted from: http://inspire.ec.europa.eu and http://veryicon.com, modified

Foreseen:

soil data and knowledge evidence easily discoverable at one place



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SoilWise KNOWLEDGE & DATA FLOWS

Which type of stakeholder are you?

Land managers (including Farmers)

Policy makers & Authorities

Mission Soil Cluster Data

Scientific community Researchers

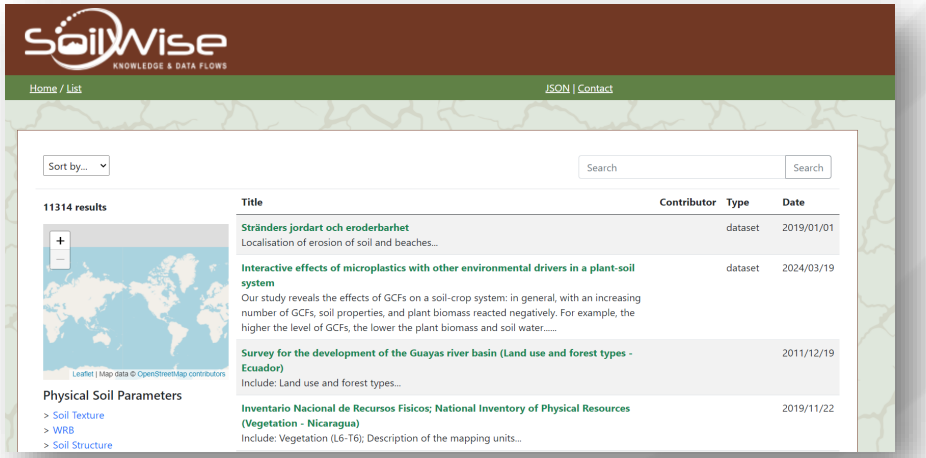
Financial / Business & Industry partners

R&I Networks

General audience (consumers, students).

But also:

Data provider



Data user

- End-users with specific needs within the projects already running
- As researchers with future needs
- As projects that will come after, representing the research community at large

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SoilWise KNOWLEDGE & DATA FLOWS

Main message

To develop a useful and functional Soil Data and Knowledge Infrastructure, the **collaboration efforts (and benefits from the outcomes) need to be mutual for all involved stakeholders** (EUSO and Mission Soil Horizon projects' end-users included)

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SoilWise
KNOWLEDGE & DATA FLOWS

What is in it for you?

- **One place** to look for knowledge and data about soil
- Improved **search, standardisation and findability** of information about soil, FAIR
- By providing **feedback** you help us create a **platform that fits your needs** as a data provider and/or a data user
- This platform can **help you in your every-day work** whenever you need to use soil information
- This platform can **facilitate collaboration** between organisations, networks, people

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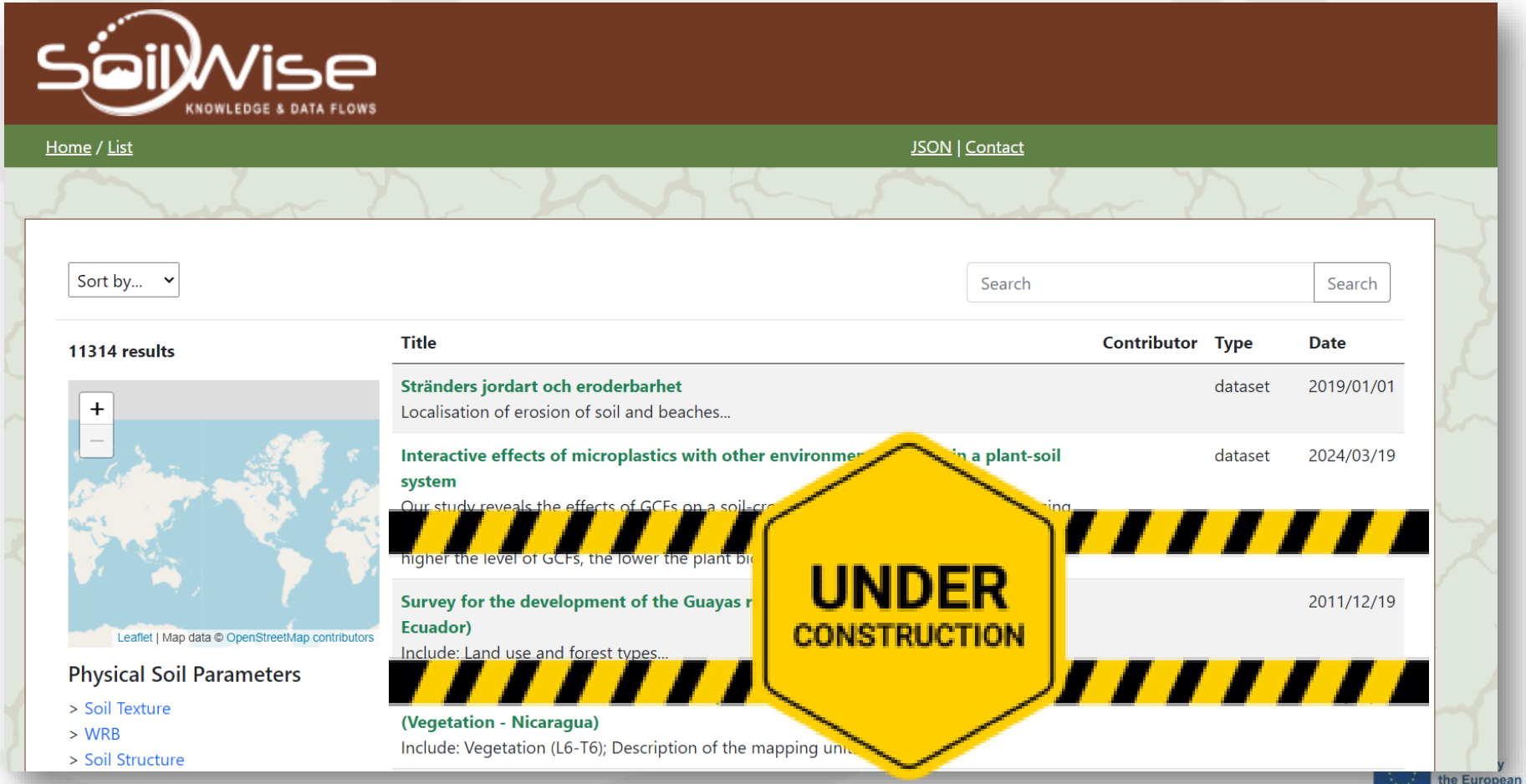
SoilWise KNOWLEDGE & DATA FLOWS

Current **PROOF OF CONCEPT** main frontend – Metadata Catalogue



Development since April 2024

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SoilWise
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Foreseen SoilWise Repository Endpoints

For soil data users For data scientists/coders Still in development

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SoilWise KNOWLEDGE & DATA FLOWS

A single discovery experience

Requires:

- Mechanisms to import from various sources
- Harmonize metadata models
- Clustering of sources (filters)
- Ranking mechanisms (which source is more relevant)
- Maintain (or establish) linkage between sources
- Establish trustworthiness

How can we do better than a generic search engine?

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SoilWise KNOWLEDGE & DATA FLOWS

We collate from the following sources at least:

implemented | foreseen

National & Regional (geo)portals

EC-governed catalogues & repositories

- INSPIRE
- data.europe.eu
- ESDAC
- Copernicus
- EEA
- Cordis

Institutional catalogues & repositories

- ISRIC
- BonaRes
- FAO
- . . .

Scholar repositories

- Zenodo
- Dataverse
- OpenAire

SoilMission HE projects' catalogues & repositories

- PrepSoil
- ISLANDR
- EJP Soil
- Impact4soil
- You?
- . . .

SoilWise
KNOWLEDGE & DATA FLOWS

How can you judge if data is suitable for your purpose?

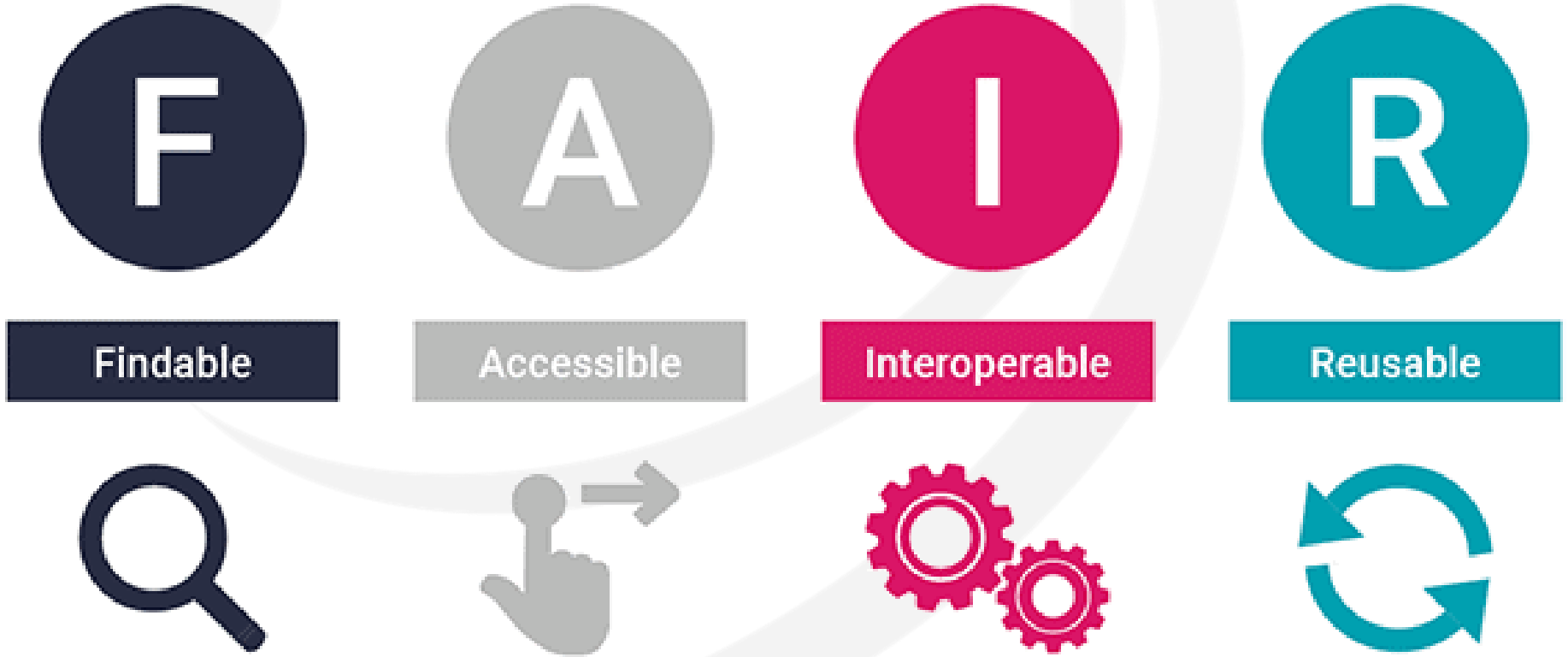

Image adopted from: http://biosistemika.com

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SoilWise KNOWLEDGE & DATA FLOWS

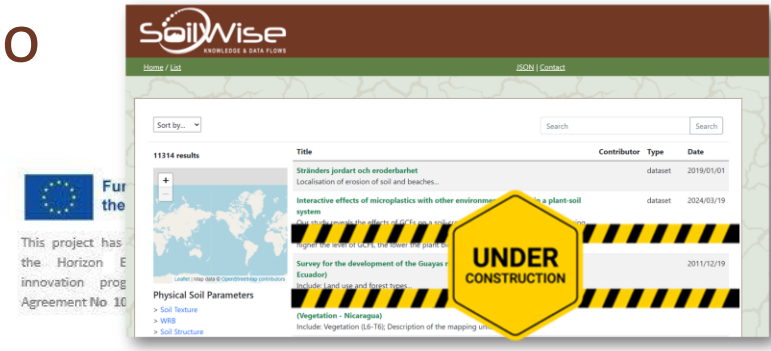
F Findable: Discover existing data

Findable

Clear links to project and other soil related sources

Step 1 is to find what is already existing, e.g. through an easily searchable catalogue, as complete as possible on the domain.

SoilWise/EUSO will allow to find, assign and provide project and other soil domain results to users, including credits.



A Accessible: Can I use the data or are there access restrictions?

Accessible

Check the access conditions (Access rights)

Step 2 is to see if the data can be used by you/for your purpose.

restricted

registration needed

no conditions apply

SoilWise/EUSO requires a license to be indicated, and is looking into controlled access mechanisms

CC-BY 4.0 license

Use open access when possible, or ask owner for access

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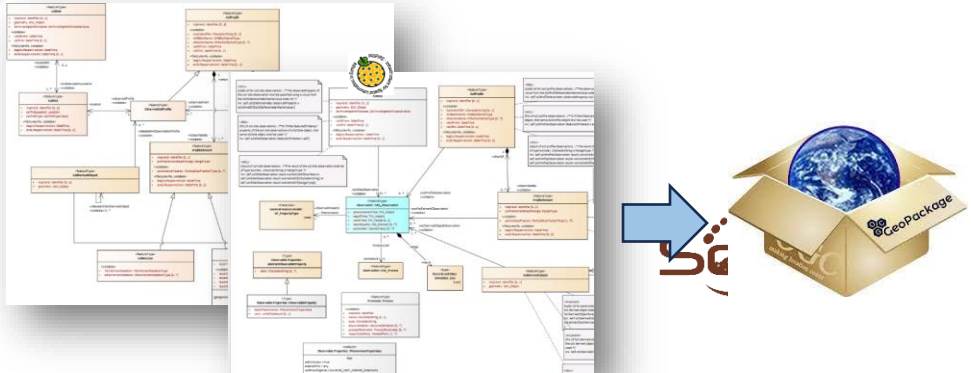
SoilWise KNOWLEDGE & DATA FLOWS

I Interoperable: Can I compile different datasets easily into one?

Apply my or a common data model

Step 3 is to understand if the data is organized in a similar way, if different datasets can easily be combined, or if transformations are needed.

SoilWise/EUSO aims to point to standard data models for providers and facilitate easy tooling for transformation of data to the extent possible



R Reusable: Is it clear what is in the data?

Clearly described datasets, using metadata

Step 4 is to understand what is in the data, how have they been collected, are they usable for another purpose

SoilWise/EUSO aims to harmonise metadata structure, perform checks on the completeness of metadata and augment if possible

- Broken links
- Synonyms
- Duplicates
- Empty fields
- Context derived additional metadata

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SoilWise KNOWLEDGE & DATA FLOWS