Soil pioneers

Boden. Pioniere2050

Lighthouse farms for climate adapted and healthy soils.

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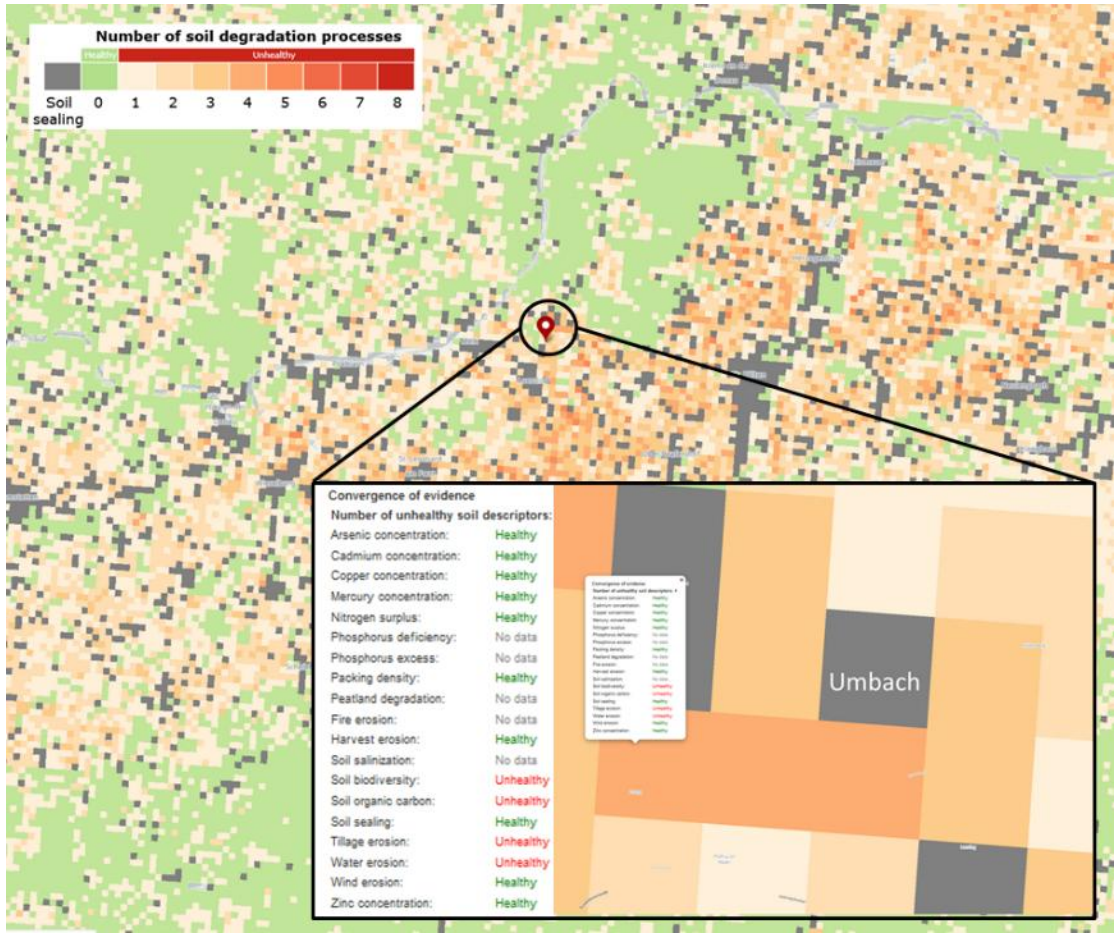
The project soil pioneers is suppored by
the Austrian Ministry of Agriculture
BMLUK and the provincial governments

Soil health at focus

EU Directive on Soil Monitoring and Resilience

From soil under threat…



EU Mission Soil

…to healthy soils until 2030

Lighthouse farms

For climate change adapted soil use

Direktsaat, Immer… biodiver… Pflanzenges… kons… Land… Damm-… groforst, …en, regenerativer A… bau, Flächen-rotte, Mobgrazing, Planting green,…

Innovation diversity in Austrian agriculture

lk

BODEN LEBEN

KOMPETENZZENTRUM MYHUMUS

HUMUS BEWEGUNG

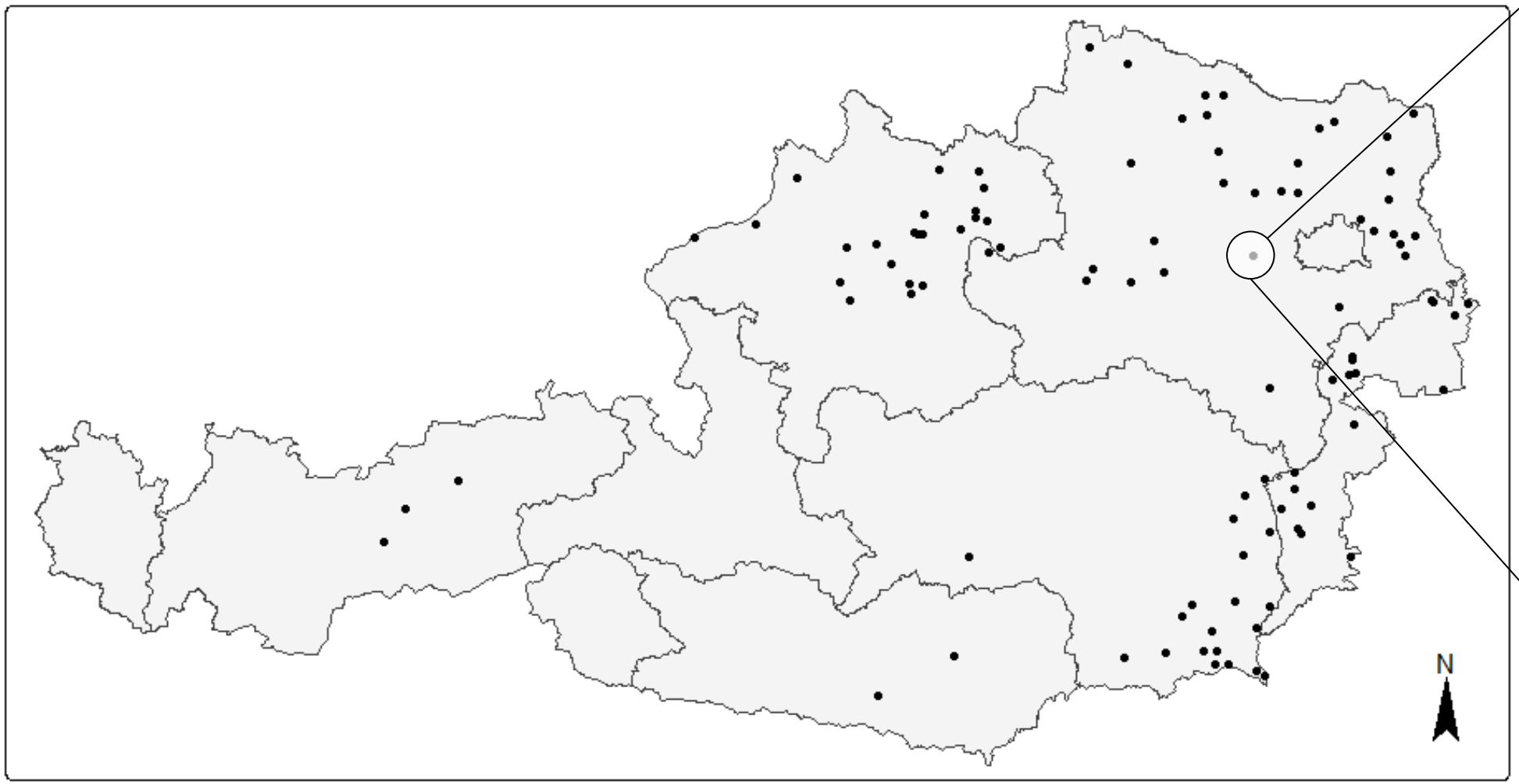
Bio AUSTRIA

bw BODEN.WASSER.SCHUTZ BERATUNG Im Auftrag des Landes OÖ

Bundesamt für Wasserwirtschaft

Austrian lighthouse farm network Soil.Pioneers

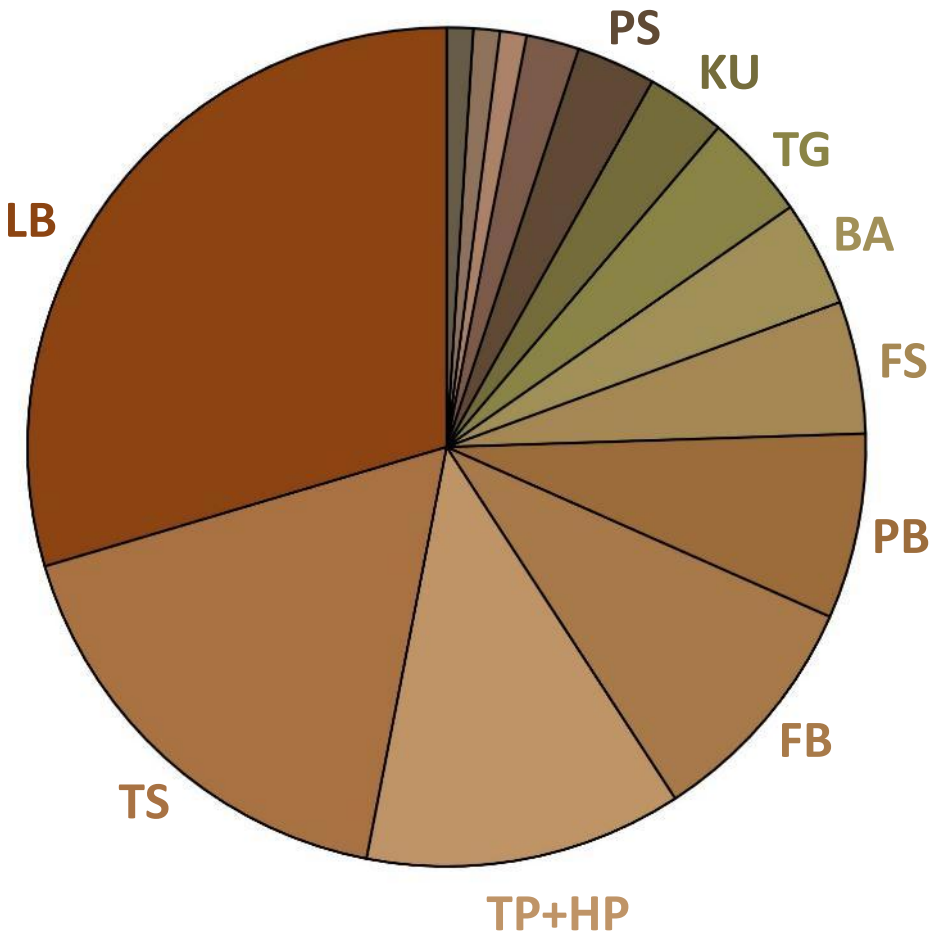
101 sites – two arable systems – field margin reference



Sampling scheme
similar to LUCAS

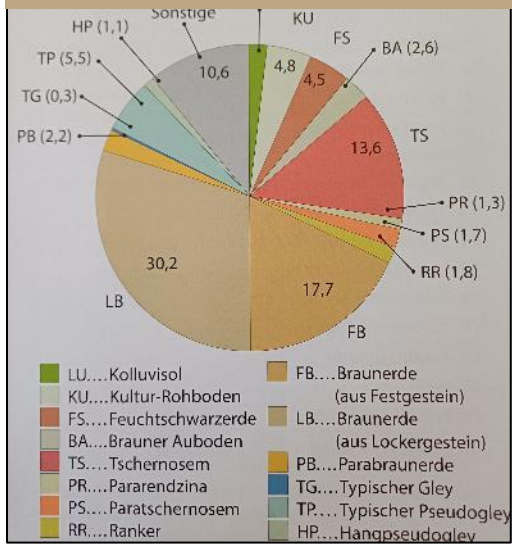
- Mixed samples of 5 locations
- 2 depths (0-15 cm, 15-30 cm)

Site properties



- Lockersediment-Braunerde (29.6%)
- Tschernosem (17.3%)
- Pseudogley (12.2%)
- Felsbraunerde (9.2%)
- Parabraunerde (7.1%)
- Feuchtschwarzerde (5.1%)
- Brauner Auboden (4.1%)
- Gley (4.1%)
- Kulturrohboden (3.1%)
- Paratschernosem (3.1%)
- Grauer Auboden (2.0%)
- Bodenformkomplex (1.0%)
- Kolluvium (1.0%)
- Reliktpseudogley (1.0%)

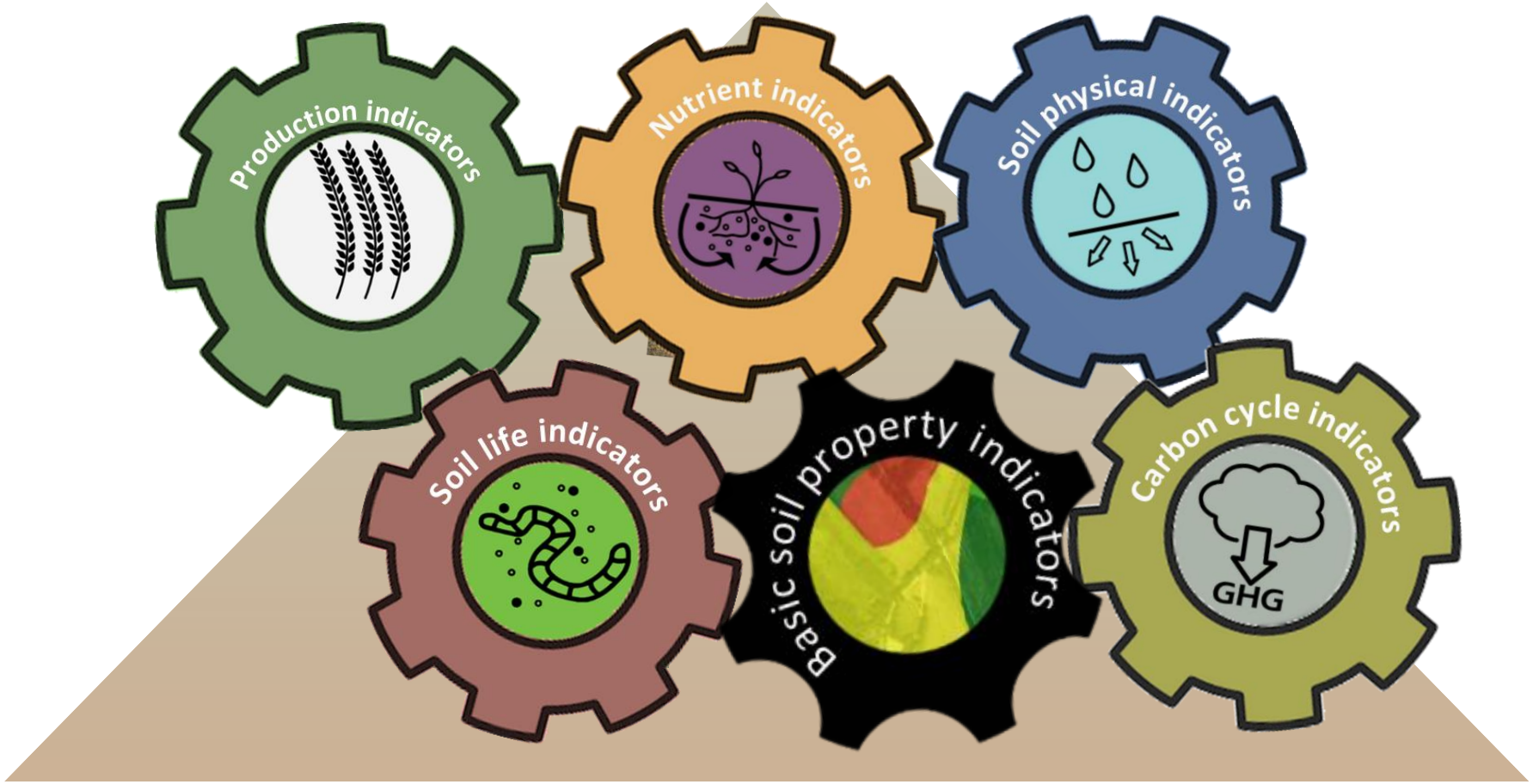
Comparison Austria



Source: Identifying and understanding arable soils

Management target

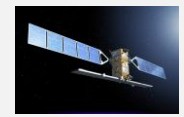
Erosion mitigation – Drought resistance – Nutrient efficiency …



Management measures

Crop rotation – Soil tillage system – Cover crops - …

Survey on management targets



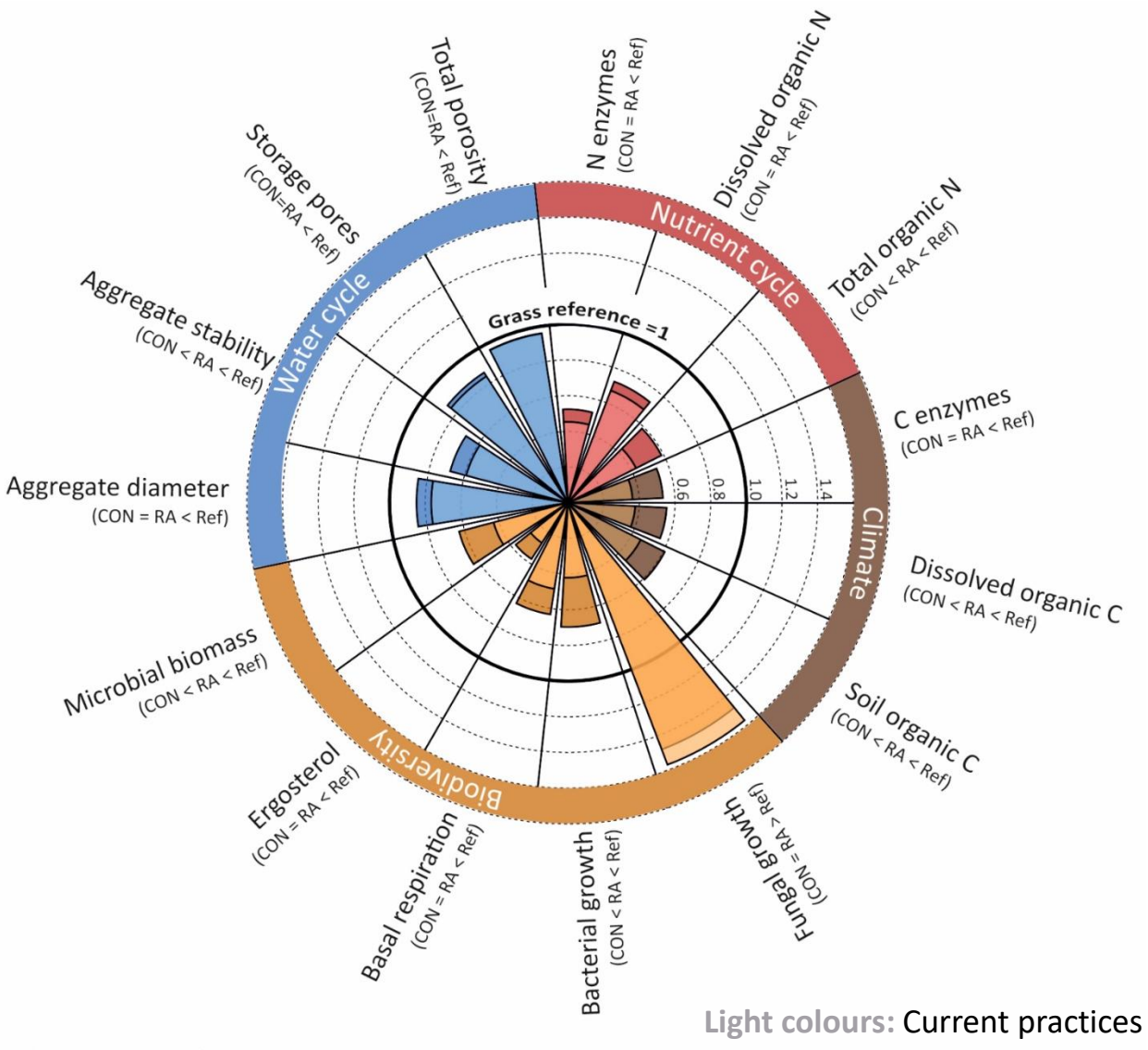
Survey on field history 2019-2024

Liebe Landwirtinnen und Landwirte!

Willkommen zu "Teil 2" des Fragebogens! Hier geht es um die Managementgeschichte der von uns im Bodenpioniere-Projekt beprobten Fläche. Wir bitten Sie darin, uns die Bewirtschaftung der Jahre 2019-2024 zu beschreiben. Die Umfrage ist recht umfangreich, kann aber jederzeit zwischengespeichert werden.

A *first* overview of changes…

Partial dataset



Light colours: Current practices
Dark colours: Improved practices

1. **Biological parameters** are most sensitive to management change.

2. **Coarse-textured soils** respond stronger compared to fine-textured soils.

3. Changes decrease with **soil depth** along with biological vs. mineral control.

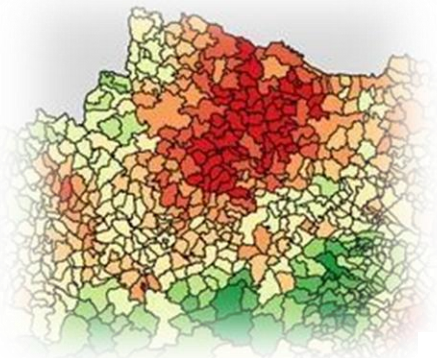
4. Soil ecosystems under **annual arable crops** essentially differ from soils under perennial vegetation

Target → Soil indicators → Management measures

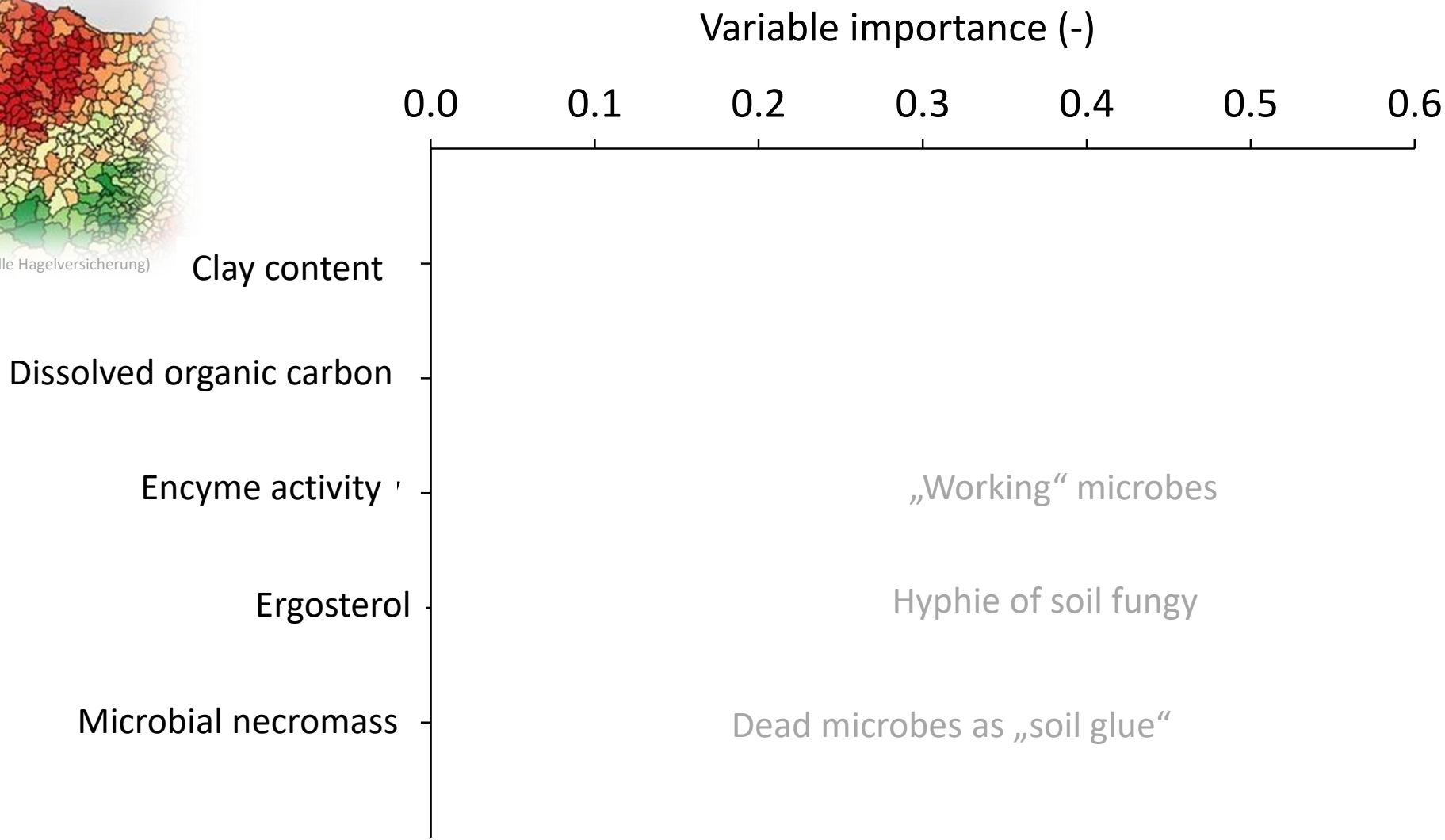
Example: Water storage target for drought adaptation

Water storage pores

... and what their drivers are.



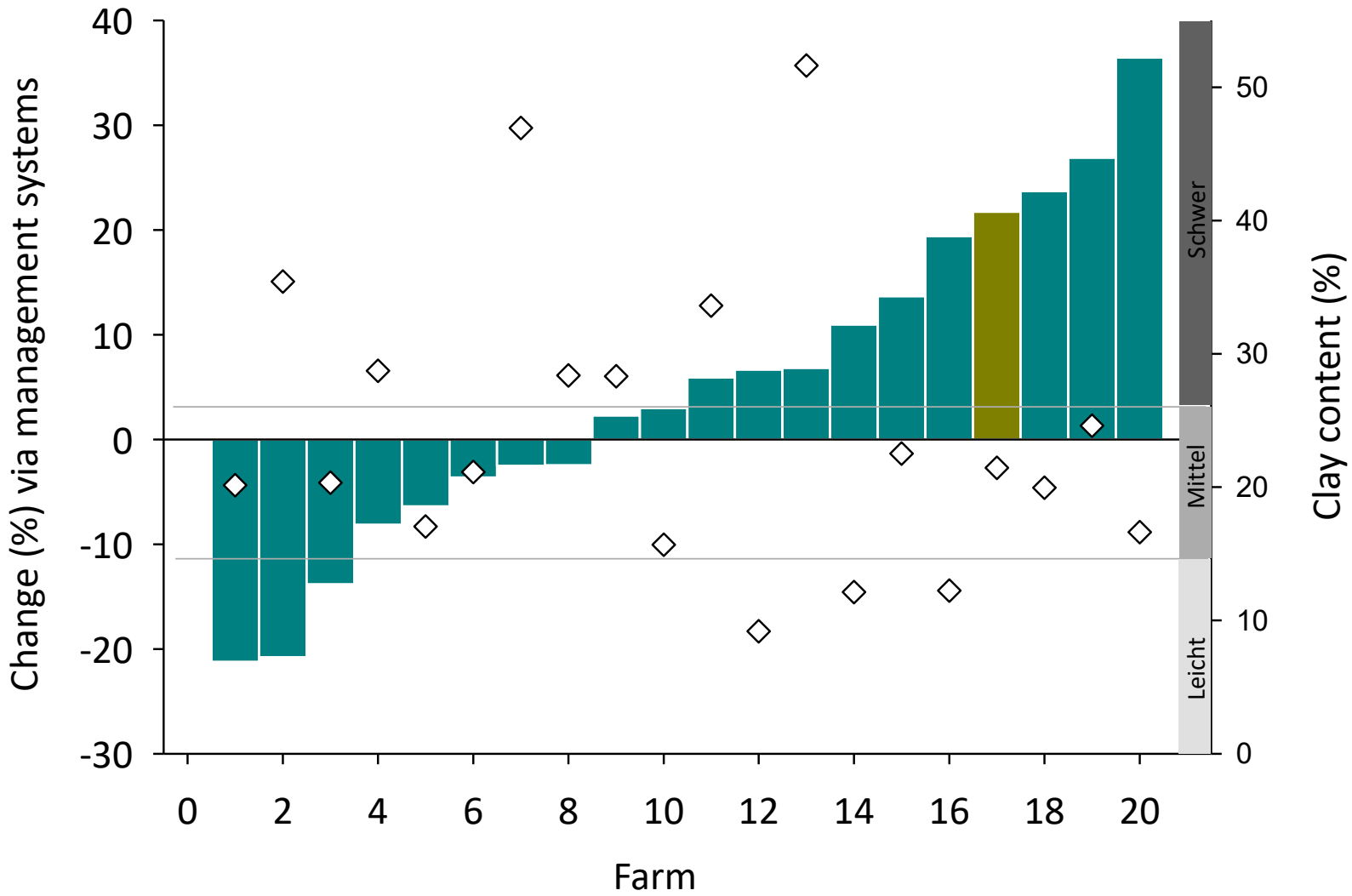
Rainfall deficit (Quelle Hagelversicherung)



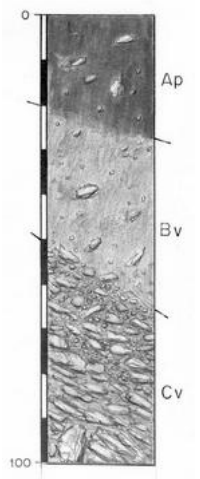
Variable selection model via Random Forests, Daten from Boden.Pioniere 1.0

Target → Soil indicators → Management measures

Example: Water storage target for drought adaptation



Example site



Cambisol

Parent material calcaric sandstone or calcaric silica-shist

Clay content: 21,4 %

Climate

Rainfall: 540 mm
Temperature: 9,0 °

Change of drivers

Dissolved organic carbon: +37 %

Enzyme activity: +119 %

Ergosterol: +142 %

Necromass: +44 %

Biohof Brunner

HUMUS BEWEGUNG

„The start of regenerative farming should always be a proper diagnostics of the current status of soils."
Franz Brunner

Start with regenerative agriculture in 2012
First measure: nutrient equilibrium

The BOKU Soil.Pioneer-team

Gernot Bodner, Katharina Keiblinger, Christoph Rosinger, Emma Izquierdo Verdiguer, Thomas Weninger, Axel Mentler, Luca Bernardini, Magdalena Bieber, Niklas Bruhn, Juliana Jäggle, Sebastian Wieser, Lea Wellinger, Neil Ashworth, Eric Smith, Ingmar Prohaska, Martin Schneider, Sabine Huber, and several student assistants.

DaFNE