PROGRESS IN STUDY SITE 10 SZANIAWY, POLAND

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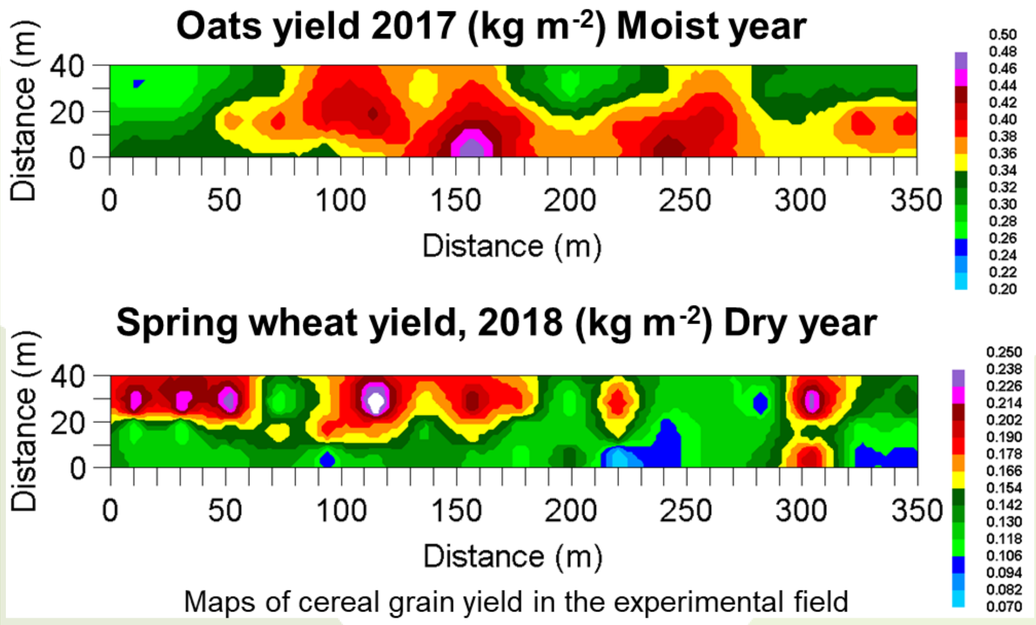
***Coordinates:** (51°58'55.1"N 22°32'22.1"E)
***Pedoclimatic zone/ Climate:** Continental
***Soils:** Haplic Podzols, loamy sands (clay 10 %, organic matter 1.4 %, pH in KCl ~4.0, cation exchange capacity 12 cmol kg^{-1}, low water holding capacity)
***Topography:** mostly flat (variation in altitudes 10 m)
***Threat/degradation:** low water holding capacity, acidity, average soil organic matter content (~1 %)
***Farming system:** conventional (>90%) and extensively grazed (mostly cattle) grasslands predominate. Arable lands with the cropping i.e. cereals (60%), maize (35%), potatoes and others (5%) are intermixed with forest and shrub/grassland
***Management of soil, water, nutrients, pests:** Main type of tillage: conventional; water: rain-fed crop production is most common; nutrients: mineral fertilizers and animal manures or occasionally farmyard manure; pests: mechanical control and/or selective spraying of pesticides. In the commune breeding of cattle and pigs is practiced. Households are also engaged in poultry breeding, milk and mushroom production

Challenges for soil and crop productivity improving:

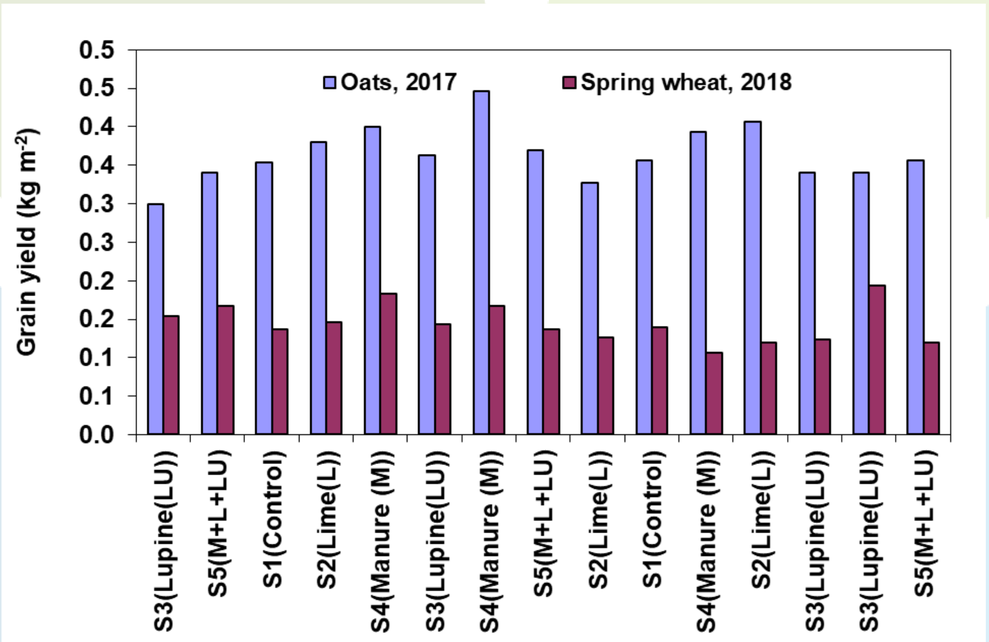
*** increasing soil organic matter**
*** increasing soil water-holding capacity**
*** decreasing soil acidity**
*** increasing share of legumes in crop rotation (dominated by cereals) to improve soil structure and biological N fixation**



Maps of cereal grain yield in the experimental field

3 LUPINE (LU) | 5 M + L + LU | 1 CONTROL | 2 LIME (L) | 4 MANURE (M) | 3 LUPINE (LU) | 4 MANURE (M) | 5 M + L + LU | 2 LIME (L) | 1 CONTROL | 4 MANURE (M) | 2 LIME (L) | 3 LUPINE (LU) | 1 CONTROL | 5 M + L + LU

1. CONTROL
2. (L) LIMING ($CaCO_3$ 5,6 t/ha)
3. (LU) COVER CROPS/ INTERCROPS – LUPINES + SERRADELLA + PHACELIA, respectively: 130 + 30 + 4 kg/ha
4. (M) MANURE (30t/ha)
5. (M+L+LU) LIMING ($CaCO_3$ 5,6 t/ha) + LUPINES + SERRADELLA + PHACELIA (130 + 30 + 4 kg/ha) + MANURE (10 t/ha)



Mean values of grain yield (n =3). 2017 – moist year; 2018 – dry year

So far obtained results indicate that the effect of the treatments on cereal grain yield was much more pronounced in moist year 2017 than dry year 2018. In the moist year the highest yield was in treatments with manure (increase by 18%) and liming application (increase by 6%). Irrespective of treatment the yield was more than half lower in dry than moist year.

***WP3: stakeholder involvement (esp. important in view of Panel comments)**

Stakeholder Panel Composition:

- Marek Lasocki, Farmer, Trzebieszów
- Małgorzata Bzowska-Bakalarz, University of Life Sciences in Lublin, Faculty of Production Engineering
- Jolanta Joniec, University of Life Sciences in Lublin, Faculty of Agrobioengineering
- Sebastian Podstawka, Organic Farmer, Jastków
- Anna Gajda, Institute of Soil Science and Plant Cultivation, Puławy

Collaboration with Schools/Universities/Institutions:

- Agricultural High School in Czartajew
- University of Life Sciences in Lublin
- Siedlce University of Natural Sciences and Humanities
- The State School of Higher Education in Chełm
- Lublin Science and Technology Park

Farmers/Local Staff of Government:

- Farmers, local staff of government and agricultural schools, involved in validation and demonstration of the innovative cropping systems
- Farmers who applied exogenous organic matter into soil (spent mushrooms substrate, chicken manure)

WP4/5: Assessment methodology

- Field plot randomized experiment (3-years) – soil-improving cropping systems applied: Infrequent legume crops in crop rotation, cover or intermediate crops (lupin, phacelia, serradella: 130+30+4 kg/ha), manure (30 t/ha) and liming ($CaCO_3$ 5.6 t/ha). Rotation: oat / wheat / triticale

WP5: Monitoring

- Precipitation, air temperature, texture, bulk density, soil water content, total porosity, thermal properties
- Visual examination: roughness, aggregate stability, cover, infiltration

WP7: Policy analysis

- >50% sandy and acid soils
- Maintenance or increase in SOM, soil structure and water holding capacity
- Application of leguminuous crops in crop rotation and lime
- The policy analysis of the law acts concerning agriculture including impact on farmers in Poland and EU

WP8: Dissemination

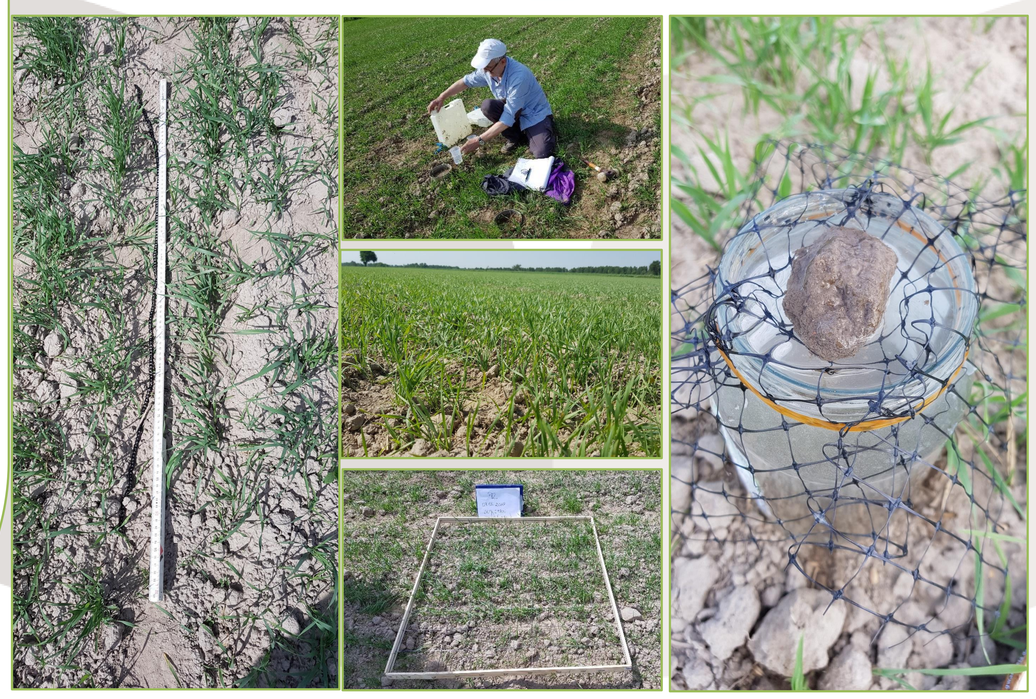
- Lipiec, J., Usowicz, B., 2018. Spatial relationships among cereal yields and selected soil physical and chemical properties. Science of the Total Environment 633, 1579–1590. https://doi.org/10.1016/j.scitotenv.2018.03.277
- Posters presentation: European Geosciences Union; Conferences: "Biodiversity of the environment - Significance, problems, challenges", "Metagenoms of different environments", "Environmental microbiology - an opportunity for safe living and biotechnological progress"
- SoilCare lefleats distribution: The Science Picnic of Polish Radio and the Copernicus Science Centre - THE EARTH; Lublin Festival of Science
- Posters presentation:

❖ European Geosciences Union, Vienna, 2018, Effect of exogenous organic matter on spatial distribution of soil physical properties and maize yield

❖ Polish soil science at the international forum, Wrocław, Poland, 2018, The influence of soil improving cropping system on microbial diversity.

❖ 12th International Conference on Agrophysics: Soil, Plant & Climate, IA PAN, Lublin, Poland, 2018, Assessment of the fungal communities of soil amended with spent mushroom substrate and chicken manure using comparative molecular approaches

- Interviews with 3 land users and 2 researchers concerning benefits and drawbacks of SICS applied in Poland



The **SOILCARE** project is a 5 year project aimed at identifying and evaluating promising soil improving cropping systems and agronomic techniques increasing profitability and sustainability across scales in Europe.

The SOILCARE project consortium consist of 28 partner institutes from 10 European countries
The SOILCARE project is coordinated by ALTERRA, Wageningen UR, The Netherlands.

• Starting date: March 1st 2016. • Ending date: February 28th 2020. • EU contract number: 677407

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