Workshop outcomes

Workshop: SLU – Ukrainian Universities Collaboration on Soil-Related Challenges 14 October 2026, Biosfären, Ultuna campus, and online

Background and aim

SLU and Ukrainian universities already work together through individual contacts, scholarships and joint projects. The workshop set out to make that cooperation more structured. Its aims were

- to discuss the most pressing soil-related challenges in Ukraine, many caused or made worse by the war;
- to share current SLU research on soil health, nutrient recycling and sustainable agriculture;
- to identify shared research priorities that could form the basis of future Horizon Europe proposals.

Oksana Valetska (Department of Soil and Environment) organised the workshop together with her colleagues Helena Aronsson (Department of Soil and Environment) and Noémi Gonda (Department of Urban and Rural Development), with support from SLU Global. Sara Gräslund of SLU Global and Oksana Valetska opened the day.

About 40 participants attended, on site and online. The following Ukrainian institutions were represented:

- Lutsk National Technical University, Lutsk
- State Biotechnological University in Kharkiv, Kharkiv
- Institute of Bioenergy Crops and Sugar Beet of the National Academy of Agrarian Sciences of Ukraine, Kyiv
- National Scientific Center “Institute for Soil Science and Agrochemistry Research named after O.N. Sokolovsky”, Kharkiv
- National University of Water and Environmental Engineering, Rivne
- National University of Life and Environmental Sciences of Ukraine, Kyiv
- V.N. Karazin Kharkiv National University, Kharkiv
- Vinnytsia National Technical University, Vinnutsia

SLU participants came from several departments and from SLU Global, and colleagues from other Swedish and European institutions also took part.

Nutrient recycling

Mariya Avhustynovych (Lutsk National Technical University) and Oksana Valetska opened the session with an overview of advances and current practices in nutrient recycling in Ukraine. Structural change in agriculture and a sharp fall in livestock numbers have left phosphorus and potassium balances negative. Manure is now largely separated from cropland, so only a small share of its nutrients is used. Most sewage sludge and municipal biowaste is still landfilled. Biogas production is growing, and digestate is beginning to be used as an organic fertiliser. Ukraine has also adapted its legal framework for waste, pesticides and sewage sludge to EU requirements. Three SLU researchers then presented Swedish work. Annika Nordin (Department of Energy and Technology) spoke on systems and technologies for recycling nutrients from sewage fractions. Jenna Senecal (Department of Energy and Technology) presented urine-based fertilisers, from nutrient recovery to fertiliser performance. Cecilia Lalander (Department of Energy and Technology) showed how the quality of frass, the residue from insect rearing, can be improved through recirculation so that it can be used as a slow-release fertiliser and soil improver.

The discussion showed that, despite very different starting points, both countries share a strong interest in recovering nutrients from organic waste streams and turning them into effective fertiliser products. Rebuilding soil organic matter is a key concern in Ukraine. Participants saw the current transition in Ukrainian agriculture, including possibilities for small-scale solutions, as a timely opportunity for joint work.

Soil remediation

Two Ukrainian presentations dealt with soils contaminated by the war. Olha Koliada (State Biotechnological University) presented an assessment of heavy-metal contamination in the context of ecosystem disruption caused by military activities. Vadym Ivanina (Institute of Bioenergy Crops and Sugar Beet of the National Academy of Agrarian Sciences of Ukraine) presented strategies for restoring soils contaminated by military activities, including phytoremediation with energy crops. Contamination differs between types of munitions and is spread very unevenly across the landscape. From SLU, Geert Cornelis (Department of Soil and Environment) presented in situ remediation of arsenic in anoxic aquifers using zerovalent iron. He stressed that the chemical form in which a contaminant occurs determines both its toxicity and the right remediation method. Oksana Golovko (Department of Energy and Technology) spoke on organic micropollutants in water. She presented low-cost treatment options such as fungal treatment and biochar filters, which are of particular interest where infrastructure has been destroyed.

The discussion found that war-related contamination raises new questions about how such soils are best assessed and restored, since experience from earlier conflicts does not fully apply today. Ukrainian colleagues expressed strong interest in research internships at SLU to gain experience with Swedish laboratory methods and to help develop soil monitoring and assessment programmes. Promising themes for joint projects were identified as innovative soil monitoring, plant- and microbe-based remediation, and biochar application for binding pollutants.

Sustainable agriculture

Valerii Koliada (National Scientific Center “Institute for Soil Science and Agrochemistry Research named after O.N. Sokolovsky”) presented erosion processes and their drivers in war-affected soils of Ukraine, from degradation to recovery. He stressed that the war speeds up soil degradation that long-term agricultural practices had already set in motion. Vyacheslav Bogdanets (National University of Life and Environmental Sciences of Ukraine) presented the monitoring of soil cover parameters for sustainable agriculture. Both presenters showed how GIS and remote sensing can be used to assess degradation and record war damage. Serhii Kunytskyi (National University of Water and Environmental Engineering) presented robotic technologies for pre-sowing soil preparation and the effects of compaction on soil properties. Such robots can also be used in areas that are too dangerous for people to work in. From SLU, Valentin Picasso (Department of Crop Production Ecology) presented perennial grains as a way to rebuild agriculture in Ukraine, drawing on Kernza trials that have run in the country since 2023. Thomas Prade (Department of Biosystems and Technology) presented the use of crop residues and intermediate crops for protein biorefining and biogas. Johanna Wetterlind (Department of Soil and Environment) presented the Swedish national monitoring of agricultural soils, which is particularly relevant as Ukrainian researchers align with EU soil legislation ahead of EU membership.

The discussion showed a common interest in better monitoring and modelling of soil degradation, in remote sensing combined with machine learning, in harmonised soil data that meets EU requirements, and in the potential of intermediate crops in Ukraine and across Europe. Participants also stressed that research should be shaped in dialogue with end users.

Emerging directions and next steps

Across the three sessions, several themes stood out as the basis for a shared research agenda. These are recycling nutrients from organic waste streams into bio-based fertilisers, rebuilding soil organic matter and carbon, assessing and remediating war-contaminated soils, and harmonised digital soil monitoring that meets EU requirements. These themes fit closely with current Horizon Europe priorities. The next step will be to set up thematic working groups to gain a better understanding of the gaps in research and practice.

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