

Implementation of urban sewage sludge amendment as Soil-Improving Cropping Systems for corn grain. What benefits on soils and production?

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Currently the productivity of some European cropping systems is maintained artificially by increasing production factors like mineral fertilizers or pesticides, using heavy machinery highly energy consuming and improving the technologies in order to mask the loss of productivity resulting from soil quality degradation.

SoilCare is an European H2020 project that aims to identify and test cropping that improve soil quality but also increase the profitability and sustainability of the agriculture in Europe.

The determination of the techniques to be tested is elaborated in a transdisciplinary and participatory approach involving the various relevant local and regional key actors.

The study areas of Portugal are located in the Baixo Mondego valley, mainly dedicated to monoculture of irrigated corn grain. Production is highly specialized and intensive based on expensive production factors as mineral fertilizers to compensate the important soil nutrients exportation after harvesting. These practices don't promote soil quality improvement in term of fertility, structure or biodiversity and it ends up leaving the soil poor and unstructured. Currently an alternative technique to mineral fertilizer, the amendment with urban sludge, is used by some farmers of the region. Nevertheless, this practice is the focus of many controversies and stakeholders identified it as a peremptory technique to be tested.

The study started in April 2018 and aims to assess and to compare soil fertility parameters evolution of 2 trial fields, one field fertilized every spring since 3 years with urban sewage sludge and a control field fertilized exclusively with conventional mineral amendment. Two sample campaigns were realized during the year, before seeding and after harvesting. A set of soil quality parameters were determined: Ph, organic matter content, Total N, P2O5, K2O, Ca, Mg, exchange bases, heavy metals, penetration resistance, infiltration capacity, decomposition rates as well as production parameters of the systems considered.

Preliminary results of the spring samples campaign point to a large significant increase of many indicators for trial field with urban sewage sludge amendment: ph (+12%), in organic matter content (+33%), K2O (+60%), P2O5 (+250%), confirming the effectiveness of the technique. Heavy metals analyse results are still not available, but will be presented in the poster.