

Soil Theme Description

Soil is as essential to human well-being as air and water. It is a key component of many ecological processes and assures the provisioning of ecosystem services such as food production, water depuration, carbon storage, crop resistance to pests and diseases.

Soil organic matter affects the biological, chemical and physical properties of the soil and therefore, plays a central role in maintain soil functionality and productivity. Especially, organic matter contributes to prevent soil erosion and land flooding and can play a role in climate mitigation. Therefore, the steady decline of organic matter in many European soils is one of the biggest environmental threats.



The use of organic residues from different sources as soil amendment represent an opportunity to increase organic matter in the soil and strength re-use of resources.

Treatment of organic residues (e.g. composting, anaerobic digestion and fermentation) prior to land application is widely used to improve soil fertility. However, a complete understanding of the short and long term effects of these treatments on soil organic matter is still lacking.

The soil theme investigates the effect of organic residues (e.g. compost, digestate, bokashi) on soil organic matter with the aim to promote the reuse of organic residues, strengthening circular economy and increase soil fertility.

Currently, three PhD projects are involved in the Wetsus soil theme.

One project focuses on identifying the chemical and microbial structure of organic residues and relate it to the changes in soil microbial community and crop growth. The project aims to select organic residues to promote or reduce specific groups of microorganisms in the soil that are respectively beneficial or detrimental to organic matter and crops. The second project focuses on identifying the key physical, chemical, and biological parameters involved in the treatments of organic residues and how they can be engineered to increase organic matter in soil. The third project focuses on phosphate recovery during anaerobic treatment of manure from digestate.

Relying on the gained insight, the Soil Theme will investigate how to integrate knowledge and expertise of Wetsus on water treatment technology to find most suitable form of organic matter addition for agricultural application.

Research Project Titles

- Improving agricultural soil with organic residues: mechanistic investigation (Yujia Luo)
- Increasing organic matter through organic residues engineering (Vania Chavez Rico)
- Calcium phosphate recovery during anaerobic treatment of manure (Chris Schott)

Soil Theme Coordinator

Valentina Sechi
valentina.sechi@wetsus.nl



Company Members



Vereniging van
Participanten Waterketen
Noord-Nederland



Research Institutes

