Closing nutrient & carbon loops – comparison on investigated innovations between CIRCULAR AGRONOMICS and NUTRI2CYCLE projects

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Keywords: nitrogen; phosphorus; carbon; loops, European agro-systems

Abstract text

Plant production and animal husbandry have each intensified independently from one another over the last century, resulting in disjunctions on nutrient and organic carbon flows between both these conventional pillars of agriculture. Thus, the European Commission launched a specific H2020 call focused on closing loops at farm and regional levels to mitigate greenhouse gas emissions and environmental contamination-focus on C, N, and P cycling in agro-ecosystems. Two projects were funded under this topic between which a collaboration has been established, NUTRI2CYCLE (GA-773682) and CIRCULAR AGRONOMICS (GA-773649). Both projects share a common objective but presenting a very different approach.

The objective of the NUTRI2CYCLE project is to address these current gaps in the N, P, and C cycles by implementing an optimized management system including innovative agro-processing technologies to better close the nutrient loops.

The innovation potential of the NUTRI2CYLE research has been structured in the following agro-technical disciplines via five distinct research lines that are cross-cutting across the three agro-pillars: 1- Biobased fertilizers (N, P) and soil enhancers (OC) from agro-residues, 2- Novel animal feeds from agro-residues, 3- Innovative solutions for optimized nutrient & GHG in animal husbandry, 4- Optimal (precision) fertilization and 5- Innovative soil, fertilization & crop management systems & practices

The consortium will initially start from a “long-list” of potential solutions along the depicted research lines, to be scrutinized using agronomic, environmental, and economic indicators. The screening process will thereby result in a short-list of prioritized techniques. This shortlist will receive further attention for validation in relevant environment.

CIRCULAR AGRONOMICS is analysing C, N and P flows, stocks and emissions within agricultural, livestock and food processing settings for six case-studies at regional and territorial level representing a variety of biogeographic scenarios and environmental challenges typical for the European agricultural sector: Catalonia (Spain), Brandenburg (Germany), Lungau (Austria), Emilia-Romagna (Italy), Gelderland (Netherlands) and South Moravia (Czech Republic).

Within these case studies, specific innovative solutions are being implemented to increase carbon stocks in agriculturally depleted soils to reduce nitrogen surplus and related GHG emissions and to increase nitrogen and phosphorus recovery from waste streams along the whole agri-food chain at European level. These solutions are grouped in three technical work packages: 1- Plant-Soil interactions, 2- Livestock emissions and residues treatment and 3- Carbon and Nutrient valorization from food-waste and food-processing waste-(water), and are reinforced by an exhaustive socio-economic and environmental assessment, exploitation plans for industrial partners, and dissemination towards different stakeholders from science, policy, industry and directly to the farmers.

References

https://www.nutri2cycle.eu/
https://www.circularagronomics.eu/