



Novafert

Working Group on Sustainability for Nutrient Recovery

16 January 2024 15:30 hrs. (CET) Online

*Towards a harmonized approach on sustainability assessment of nutrient recovery pathways:
Setting LCA methodological priorities.*

**Biogenic Carbon accounting modelling: State of the art, limitations,
and global trends towards the integration of realistic modelling in LCA.**

Agenda (16/01/2024)



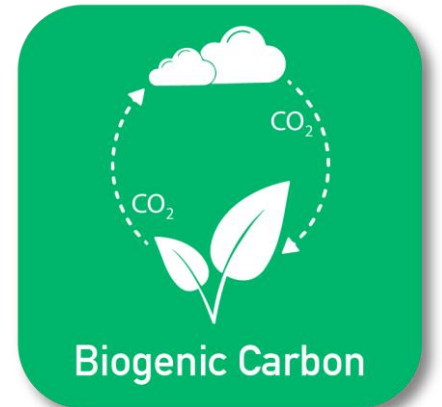
- Welcome and moderation by *Carlos A. Torres-Guerrero, BETA-UVIC. (15:30 hrs)*
- Project approach:** the vision of NOVAFERT by *Jorge Senan, BETA-UVIC. (15:32 hrs)*

- Soil Organic Carbon modelling**
 - Jørgen Eivind Olesen, Aarhus University, Denmark. (15:35 hrs)*
 - Daniele De Rosa, University of Basilicata, Italy. and Panos Panagos, JRC, EC. (15:50 hrs)*
- Q&A session with the audience (16:05 hrs)

- Biogenic Carbon Accounting in LCA framework**
 - Massimo Pizzol, Aalborg University, Denmark. (16:15 hrs)*
 - Coupling Soil Organic Carbon modelling into LCA framework, *Christhell Andrade University of Toulouse, France. (16:30 hrs)*
- Q&A and Interactive session with the audience (16:45 hrs)

- Concluding remarks. (16:55 hrs)

- Biogenic carbon has been recognized as a key element in the mitigation strategies of climate change
- Some iconic techniques: Soil Carbon Sequestration or Carbon Capture for Utilization and Storage (CCUS)
- Agricultural soils may be a relevant carbon sinks
- There are several initiatives and projects to harmonise the biogenic carbon accounting (Aligned project, Life Cycle Initiative...)



NOVAFERT: NOVEL PROCEDURES AND SUSTAINABLE GUIDELINES TO ENHANCE THE USE OF ALTERNATIVE FERTILISERS



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Bio-based fertilizer definition (a proposal)

“fertilizer product derived from renewable biomass related resources which purpose is to provide plants or mushrooms with nutrients or improve their nutrition efficiency.” Egas et al (2024)

It involves a wide range of:

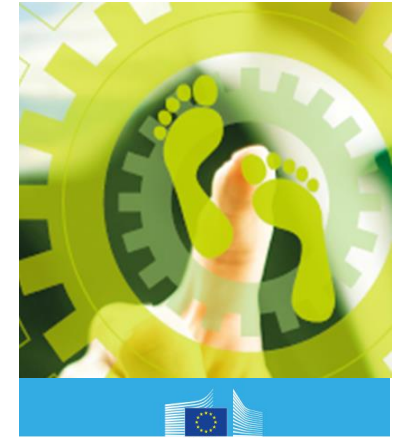
- products compositions (compost, ammonium sulphate, struvite...)
- technologies (composting, stripping, precipitation, etc.)
- waste/biomass streams (wastewater, manure, slaughterhouse waste, etc.)



“**NOVAFERT** aims to orientate the production and the application of alternative fertilising products (or Bio-based Fertilisers-BBFs) according to the best environmental performances, by establishing methodological guidelines for the assessment of alternative fertilising products’ production, storage, distribution and application”.

Product Environmental footprint (PEF)

- An initiative of the European Commission to harmonise the methodologies to quantify the environmental footprint of different sectors.
- A Life Cycle Assessment based methodology
- **NOVAFERT WP2** aims to develop a **common method for environmental assessment** of alternative fertilising products' production, storage, distribution and application: A PEF-wise methodology



JRC TECHNICAL REPORT

Guide for EF compliant data sets

Version 2.0

Fazio S., Zampori L., De Schryver A.,
Kocher O., Thellier L., Diaconu E.

2020



EUR 20175 EN

Defining a PEF-wise methodological guideline

Prototipe of a Product Environmental Footprint Category Rules (PEFCR) for BBFs will propose the general requirements and advice to obtain a robust Cradle-to-Grave LCI for BBFs

- i. common Functional Unit
- ii. a single LCIA method
- iii. common steps to implement allocation procedures for multifunctional systems
- iv. CFF formula applicability
- v. provide guidance regarding how to handle carbon flows during the product's life-cycle. E.g. carbon storage and biogenic emissions
- vi. data gaps
- vii. representative products
- viii. emissions from biofertilizer application and use on the field (outside the scope of PEFCR for bio-based fertilizers)
- ix. additional environmental burdens (i.e. affections to biodiversity, soil texture) falling outside the scope of LCA

Soil Organic Carbon Modelling

Jørgen Eivind Olesen, Aarhus University

Professor in climate and agriculture at Aarhus University and head of Department of Agroecology. His research encompasses experimental and modelling studies on agricultural carbon and nitrogen cycles at local to global scales, including climate change impacts on agriculture and agricultural greenhouse gases and their mitigation.

He has participated in several governmental committees on reduction of greenhouse gas emissions from agriculture, adaptation to climate change, integrated crop management, and reduced tillage practices. He has contributed on expert panels of the EU and The World Bank. He also contributed as an author to the third IPCC assessment report and as a lead author for the IPCC fourth assessment report, which received the Nobel Peace Prize in 2007.





Daniele de Rosa, University of Basilicata

Daniele De Rosa currently holds the position of Senior Research Fellow at the University of Basilicata in Italy. He actively conducts research activities in the fields of environmental, soil, and agricultural sciences, with a primary goal of improving the sustainability of agricultural practices and preserving soil health. His expertise lies in the integration of modeling approaches to gain insights into the spatiotemporal changes affecting the dynamics of the nitrogen and carbon cycles within the soil-plant-atmosphere system.





Panos Panagos, Joint Research Centre – European Commission

Professor Panos Panagos is a soil scientist. He leads the development of advanced soil erosion models and contributes to the European Soil Data Centre (ESDAC). Also, He has made significant contributions to the field of soil science, particularly in soil erosion, land degradation, and soil mapping. Prof. Panagos has been actively involved in various international projects aimed at assessing and monitoring soil health, promoting sustainable land management practices, and addressing the global challenges of soil degradation. His work often involves the use of advanced technologies and modeling techniques to understand soil processes and dynamics. Beyond his research,

Professor Panagos is also involved in teaching and advocating for policies that prioritize soil conservation and sustainable land use.





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Question and answers session

Biogenic Carbon Accounting in LCA framework



Massimo Pizzol, Aalborg University

Professor at the Department of Planning. His teaching and research interests are in the fields of sustainability, industrial ecology, and Life Cycle Assessment. At Aalborg university Massimo is member of the Danish Center for Environmental Assessment and of the TECH center for circular economy. His current research focus is the assessment of the sustainability of emerging technologies, in particular technologies for the circular blue and green bioeconomy - this is investigated using interdisciplinary and mixed-methods approaches and tools, from stochastic life cycle models to interviews, and with an explicit attention to uncertainty and scenario analysis. He is involved in several research project on these topics and currently coordinates the ALIGNED EU project (www.alignedproject.eu) on harmonizing methods for the life cycle assessment of bio-based products, and within the project works to improve methods for carbon accounting within LCA, focusing on dynamic life cycle inventories, identifying the best approaches for including biogenic carbon, and investigating how competition for biomass feedstocks can be included in the assessment.





Christhell Andrade Díaz, University of Toulouse and Universidad Técnica de Manabí

Currently works as an Associate Professor in the Chemical Processes Department at the Technical University of Manabí, with over 5 years of experience in teaching at the Chemical Engineering School. Works in the private sector as a consultant for ISO certifications and in agrochemical industries as a researcher for innovative biofertilizers and biostimulants. Postdoc at INSA Toulouse, researching the use of crop residues to supply renewable carbon to the bioeconomy to transition towards low fossil-carbon economies. Focused on soil carbon sequestration and negative emissions technologies. Her latest research work involves the coupling of soil modeling tools with LCA studies to provide an overall vision of the possible technologies toward net-zero goals. Besides the main topic, interested in using crop residues as biomaterials for bioremediation of emerging pollutants and bioenergy production.





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Question and answers session

Thank you for your attention

Organizers



Researcher in sustainability and soil science
carlosalberto.torres@uvic.cat



Researcher on Sustainability Assessment
jorge.senan@uvic.cat



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