

CURRICULUM VITAE for Jørgen Eivind Olesen, born 28.10.1958

Professor and head of department Jørgen E. Olesen, Aarhus University, Department of Agroecology, Blichers Allé 20, 8830 Tjele, Denmark, e-mail: jeo@agro.au.dk, Tel: +45 40821659

Scientific degrees

M.Sc. in agriculture from Royal Veterinary and Agricultural University (KVL) (1983)

Scientific positions

1983-1986 Scientist, Danish Institute of Plant and Soil Science, Agrometeorological Service
1986-1991 Head of department, Danish Institute of Plant and Soil Science
1991-1994 Scientist and senior researcher, Danish Institute of Plant and Soil Science
1994-2003 Head of research group on Crop Production, Danish Institute of Agricultural Sciences
2003- Professor in climate change and agriculture, Aarhus University
2010-2019 Section leader, Climate and Water, Aarhus University
2011-2016 Adjunct professor at University of Copenhagen
2012-2023 Affiliated teacher and researcher at Sino-Danish Center for Education and Research
2015- Adjunct professor at Ganzu Agricultural University, China
2018- Affiliated researcher at Global Change Research Institute, Brno, Czech Republic
2019- Adjunct professor at China Agricultural University, China
2020- Head of department, Department of Agroecology, Aarhus University

Research focus

His research has focused on understanding the interplay between the components of the agroecosystem and the environment with the ambition to develop high productive agricultural systems with low greenhouse gas emissions, low nutrient leakages and preservation of soil fertility and biodiversity at field and landscape scales. He has explored this from many different angles covering scales from laboratory to global, with an emphasis on revealing the importance of spatiotemporal interactions. His research has bridged experimental and modelling studies, and he has developed dynamic crop-soil-weather models and farm scale models, which have been calibrated against data from laboratory and field experiments and validated against data from long-term experiments and farm scale data. These models have been used for assessing the impacts of climate change on crop production in Europe and across the world, as well as for suggesting and evaluating potential adaptation measures. He was among the researchers initiating the efforts to improve the confidence in modelling climate change impacts through model intercomparison and improvements, an effort that has dominated the research on climate change and crops over the past decade and provided new insights into crop responses to climate change, as affected by abiotic and biotic extremes.

His research on climate change impacts have also included the effects of the agricultural carbon and nitrogen cycle, and he was among the first internationally to address these issues, both through analyses of long-term datasets and through modelling, using both dynamic models and empirical models that have been applied from field to catchment and regional scales (e.g. the Baltic Sea). This research has revealed the vulnerability of both agricultural systems and of associated aquatic ecosystems through their interactions in terms of effect on nutrient (nitrogen and phosphorus) loading and the sensitivity of the ecosystems to changes in nutrient loading.

His research has also concerned the contribution of agricultural systems to greenhouse gas emissions, including changes in soil carbon as well as methane and nitrous oxide emissions. This research has primarily covered the mechanisms by which crop and soil management influence nitrous oxide emissions. This has recently led to improved understanding of the mechanisms by which crop

residues influence nitrous oxide emissions and affect soil carbon storage, paving the way for a novel way to account for nitrous oxide emissions at the global scale and which provide new options for mitigating these emissions. Recent novel basic research insights include the contribution of different plant species (grasses and legumes) to the carbon and nitrogen cycles of deep subsoils, a frontier of research, where he has been involved in the use of novel research technologies such as carbon and nitrogen isotopes and genomic sequencing for exploring the underlying functions determining the role of plants for deep subsoil carbon dynamics. He has developed both dynamic and empirical models for the greenhouse gas emissions and soil carbon in soil, and he was among the first globally to develop a farm scale model for greenhouse gas emissions, which has provided insights into the importance of farm level interactions for greenhouse gas emissions, influencing the research on mitigation strategies.

He has initiated two long-term experiments on agroecological approaches, one on arable organic cropping systems (in 1997) and one on conservation agriculture (in 2003). These experiments have provided the foundation for basic research on how long-term changes in soil-plant interactions affect carbon and nitrogen cycling, and how this can be influenced through crop and soil management practises, including the use of multi-species mixtures and the importance of intercropping in space and time. This has led to an improved basic understanding of the linkages between carbon and nitrogen cycling and the impacts of abiotic (e.g. drought) and biotic (diseases, pests, weeds) interactions affecting crop yield and quality. He has taken this insight further into the development of crop models that better integrate these stressors for developing resilient and productive agroecosystems with less use of external inputs and lower environmental and climate impacts.

He has during his research uncovered some of the fundamental mechanisms for the interactions between the components of cropping and farming system that determine sustainability parameters with respect to productivity, greenhouse gas emissions, nitrogen losses (ammonia volatilization and leaching of both nitrate and organic nitrogen) and soil fertility and health, with respect to the influence of abiotic and biotic stressors. This improved knowledge is currently being used to develop novel cropping systems that make use of basic innovations in genomic and digital technologies to improve the structure and management of cropping systems that allow development and implementation of new cropping systems with radical improved performance.

Research networks

He has been very active in European research programmes with a research network on agriculture and cropping systems research that has expanded to USA, China and Africa. He has been leading the revitalisation of dynamic crop modelling for describing and understanding the interactions between crops, soils and the environment, as part of the European MACSUR and the global AgMIP activities. He has been involved in initiating and sustaining the activities under the Global Research Alliance on Agricultural Greenhouse Gas emission. His work on the long-term experiments is currently being implemented as part of the European ESFRI research infrastructure ANAEE, where he is board member. He has further been involved in the organisation of multiple scientific conferences and workshops, and he is currently chair of the Scientific Advisory Board of the EU FACCE JPI.

Educational activities

He has developed a MSc course on Carbon Cycling and Climate Change for the study programme on Agroenvironmental Management at Aarhus University, and a MSc course on Global Change for study programme on Water and Environment at Sino-Danish Center for Research and Education in Beijing. He has developed a textbook (published by Wiley) on climate change for BSc and MSc students titled "Life in Europe under climate change". He has also been a teacher on several BSc and MSc courses at Aarhus University and University of Copenhagen.

Policy support

He has participated in several governmental committees on reduction of greenhouse gas emissions from agriculture, adaptation to climate change, integrated crop management, and soil management practices. He has contributed to expert panels of the EU, The World Bank and FAO. He has 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. He was member of the Commission on Climate Change Policy under the Danish Ministry of Climate and Energy, and member of the Commission on Nature and Climate. He has also been member of the Danish Ethical Council. He has been responsible for coordinating policy support at Aarhus University on issues within aspects related to agriculture and climate change. He has since 2022 been member of the committee on policy support under The Royal Danish Academy of Sciences and Letters.

Ongoing research projects

N2OResidue, New emission factors for nitrous oxide from crop residues (PI), Ministry for Food, Agriculture and Fisheries of Denmark, 2024-2028, 2.0 mill. €.

SmartField (co-PI), 2024-2029, Novo Nordisk Foundation, 18.0 mill. €.

AdAgriF, Advanced methods of greenhouse gases emission reduction and sequestration in agriculture and forest landscape for climate change mitigation (co-PI), 2023-2028, Ministry of Education, Youth and Sports of Czech Republic, 19.8 mill. €

CSR, ClimateSmartResearch (WP lead), 2025-2030, EU Horizon, 12.6 mill. €

Research leadership

He has been leading in developing the research agenda for the agricultural green transition, e.g. through Scientific Advisory Board of FACCE that developed a Strategic Research Agenda (2020) that has been formative for the EU Horizon calls in cluster 6. He also led the development of the roadmap for research and innovation in Denmark for building a greener and sustainable agriculture (2023), which has been the foundation for the AgriFoodTure public-private partnership at the core of research-based innovation for the agricultural green transition in Denmark.

He has since 2020 been head of Department of Agroecology at Aarhus University. During this period, he has implemented a renewal of the department strategy, organisation, research, staffing and educational activities, in particular:

- A strategy focused on research underpinning the green transition of agriculture.
- Organisation that supports research quality and execution, expands modern facilities and supports an engaged and inclusive working culture.
- Developing procedures and a culture that supports scientific discussions across disciplines and challenges current concepts as well and international engagement.
- Development of new BSc and MSc educational programmes in plant, food and soil sciences.
- Recruitments of a new generation of research staff at assistant, associate and professor level.
- Since starting as head of the department the external research funding has more than doubled from around 20 to 45 mill. € per year.

Publications

He has published 403 papers in international scientific journals and book chapters with peer review, 241 papers at conferences, 121 in reports, and 342 in technical letters and popular science papers. The peer reviewed journal papers have been cited 26,612 times (ISI WoS) giving a h-index of 80 (google scholar shows 45,742 citations and a h-index of 104). WoS lists 13 highly cited papers. ORCID: 0000-0002-6639-1273