

# , Curriculum vitae for Bente Foereid

## Contact details:

NIBIO, Ås, Norway, bente.foreid@nibio.no, phone: +47 40105960

## Education:

- 2014 Postgraduate Certificate of Higher Education Teaching, University of Abertay Dundee.
- 2003 Ph.D., Agroecology, Royal Veterinary and Agricultural University.
- 1993 Postgraduate Certificate of Teaching, University of Oslo.
- 1993 Cand. Scient. (M.Sc.), Plant Physiology, University of Oslo.
- 1991 Cand. Mag. (B.Sc.), Biology, University of Oslo.

## Employment:

- 2014-present Researcher, Bioforsk/NIBIO, Norway.
- 2012-2014 Lecturer Environmental and Soil Science, University of Abertay Dundee, UK.
- 2009-2011 Postdoctoral Associate, Cornell University, USA.
- 2009-2009 Research Officer, Cranfield University, UK.
- 2006-2009 Postdoctoral Fellow, University of Aberdeen, UK.
- 2004-2005 Research Scholar, International Institute for System Analysis, Austria.
- 2002-2004 Plant Ecophysiological Modeller, Macaulay Institute, UK.
- 1998-2001 Ph.D.-student, KVL, Denmark.
- 1997-1998 Researcher Telemark College, Norway.
- 1996-1997 Lecturer/Researcher, Volda College, Norway.
- 1995-1996 Teacher, Røyken High School, Norway.
- 1994-1995 Executive officer, Ministry of Agriculture, Norway.

## Research interests:

I am interested in the biogeochemistry of carbon and nitrogen cycling and greenhouse gas emissions in natural and managed systems, and how it can be modelled. I am particularly interested in decomposition of plant material, waste resources, soil organic matter and how it depends on biotic and abiotic factors, how it affects soil fertility and how global environmental change is likely to affect it.

## Grants:

- RCN BlueBio collaboration grant: “BIORAS\_SHRIMP - Improvement and innovation of a BIO-secure Recirculating Aquaculture System for SHRIMP and additional biomass circular production”, partner, WP-leader 2022.
- RCN “UV effect on the carbon cycle – Global Environmental Effects Assessment Panel”, project leader, 2021.
- RCN “Fish sludge for export and organic agriculture?” project leader, 2020.
- EU Horizon 2020 project, SEA2LAND – “Producing advanced bio-based fertilizers from fisheries wastes”, partner, WP-leader, 2020.
- RCN cooperation with India grant: “Greenhouse gas emissions from biogas digestate applications to rice production systems”, project leader, 2018.
- EEA green innovation grant with Slovak Republic: “Organic waste management in Nitra Region”, partner, 2016.
- Biodiversa European Collaboration project: “REPEAT – Restoration and prognosis of peat formation in fens”, partner, WP-leader, 2016.
- EEA green innovation cooperation grant with Hungary: “Development of green and innovative organo-mineral fertilizer products and prototype equipment for their production”, partner, 2016.
- EU interreg “Biogass 2020” partner, 2015.

Project with the Norwegian Agricultural Authority: “Compost – better agronomic practise for increased food production” project leader, 2015.

The Royal Society Research Grant: “Photodegradation and soil greenhouse gas emissions” 2014.

EU TA interact, “Photodegradation in peat decomposition” travel grant, 2013.

Sages travel fund, 2012.

Carnegie Trust “Effect of photo-exposure on nitrogen turnover in a semi-arid area and potential agricultural use” 2012.

NSF grant “Acquisition of a hydropyrolysis unit for pre-treatment for isotopic analysis and black carbon quantification” 2010.

COST639 – Soil Carbon Models for Kyoto Reporting – travel fund 2008-2009

Short visit grant from ESF 2008 “The role of photo-degradation in the global carbon cycle”.

Workshop grant from QUEST/NERC 2007 “Using isotope data to better quantify the global nitrogen cycle”.

### **Academic supervision:**

Supervise 1 NMBU PhD student, 2019-

Supervised one internship student from Oslo University 2021

Supervised 1 student from Université de Lorraine, France, summer 2019.

Supervised 4 master students and 2 internship students from KIIT University, India, 2019.

Supervised 1 student from ETH, Zürich, 2017.

Supervised 2 NMBU master students 2016-17, and 1 student 2020-2021.

Supervised/hosted academic visitor Alessio Cibati, 8 months, 2012-2013.

Examined 3 Ph.D.-thesis (Oscar Primo, University of Cantabria, 2008, Asta Kazlauskaite-

Jedzevice, Aleksandras Stulginskis University, 2016, Hesam Mousavi, Inland Norway University of Applied Sciences, 2023).

### **Proposal and project review:**

Expert evaluator and crossreader Horizon proposals Pathfinder Challenges 2022-2023.

Expert evaluator for Horizon Europe proposals: “Innovations for soil improvement from bio-waste” 2022.

Expert evaluator for Horizon Europe proposals: “WIDERA: ERA chairs” 2022.

Assessment H2020 project NUTRIMAN, 2021.

Expert evaluator for H2020 proposals “High-quality organic fertilisers from biogas digestate” 2019.

### **Reviewing:**

Member of Editorial Board of Geoderma

Reviewer for many journals: Geoderma, New Phytologist, Plant and Soil, PLOS Climate, Journal of Ecology, Waste Management, Agricultural and Food Science, Biomass and Bioenergy, Agronomy, Agriculture, Plants, Forests, Environments, Sustainability, Land, Life, Water, Horticulturae, Microbiology Research, Scientific Reports, Atmosphere.

### **Other:**

Author in UNEP Environmental Effects Assessment Panel (EEAP) 2020-2023

Guest Editor “Advances in Organic Matter Residue Application for Sustainable Agriculture” 2020.

### **Peer-reviewed scientific publications published or accepted in refereed journals:**

1. Barnes PW, Robson TM, Zepp RG, Bornman JF, Jansen MAK, Ossola R, Wang QW, Robinson SA, **Foeroid B**, Klekociuk AR, Martinez J, Abaigar J, Hou W-C, Mackenzie R, Paul ND 2023.

Interactive effects of changes in UV radiation and climate on terrestrial ecosystems biogeochemical cycles, and feedbacks to the climate system. Photochemical & Photobiological Sciences,

<https://doi.org/10.1007/s43630-023-00376-7>

2. Aurdal SM, **Foereid B**, Sogn T, Børresen T, Hvoslef-Eide T, Remberg SF 2022. Growth, yield and quality of tomato *Solanum lycopersicum* L grown in sewage-based compost in a semi-hydroponic cultivation system. *Acta Agriculturae Scandinavica, Section B - Plant Soil Science*, 72, 902-912.
3. **Foereid B**, Szocs J 2022. Does Loading Ammonium to Sorbents Affect Plant Availability in Soil? *Agriculture*, 12, 1057. doi.org/10.3390/agriculture12071057
4. Barnes PW et al. 2022. Environmental effects of stratospheric ozone depletion, UV radiation, and interactions with climate change: UNEP Environmental Effects Assessment Panel, Update 2021. *Photochemical & Photobiological Sciences*. <https://doi.org/10.1007/s43630-022-00176-5>
5. Dietrich M, Fongen M, **Foereid B** 2021. Anaerobic digestion affecting nitrous oxide and methane emissions from the composting process. *Bioresource Technology Reports* 15, 100752.
6. **Foereid B**, Szocs J, Patinvoh RJ, Horváth IS 2021. Effect of anaerobic digestion of manure before application to soil – benefits for nitrogen utilisation? *International Journal of Recycling and Organic Waste in Agriculture*, 10, 89-99.
7. Neale RE et al. 2021. Environmental effects of stratospheric ozone depletion, UV radiation, and interactions with climate change: UNEP Environmental Effects Assessment Panel, Update 2020. *Photochemical & Photobiological Sciences*, 20, 1-67.
8. **Foereid B**, Alvarenga E, Szocs J, Makádi M 2020. Uptake and leaching of sorbed ammonium during early growth of wheat. *International Journal of Recycling and Organic Waste in Agriculture*, 9, 221-228.
9. Dietrich M, Fongen M, **Foereid B** 2020. Greenhouse gas emissions from digestate in soil. *International Journal of Recycling and Organic Waste in Agriculture*, 9, 1-19.
10. **Foereid B**, Alvarenga E, Szocs J, Makadi M 2019. Ammonium sorbed to zeolite is partly available to wheat in the first growth cycle. *Agronomy*, 9, doi:10.3390/agronomy9030122.
11. **Foereid B** 2019. Nutrients recovered from organic residues as fertilizers: Challenges to management and research method. *World Journal of agriculture and Soil Science*, 1, WJASS.MS.ID.000519.
12. Nesse AS, Sogn T, Børresen T, **Foereid B** 2018. Peat replacement in horticultural growth media: the adequacy of coir, paper sludge and biogas digestate as growth medium constituents for tomato (*Solanum lycopersicum* L.) and lettuce (*Lactuca sativa* L.) *Acta Agriculturae Scandinavica, Section B — Soil & Plant Science*, 69, 287–294.
13. **Foereid B**, Zarov EA, Latysh IV, Filippov MI, Lapshina ED 2018. Photo-exposure affects subsequent peat litter decomposition, *Geoderma*, 315, 104-110.
14. Cibati A, **Foereid B**, Bissessur A, Hapca S 2017. Assessment of *Miscanthus x giganteus* derived biochar as copper and zink adsorbent: Study of the effect of pyrolysis temperature, pH and hydrogen peroxide modification. *Journal of Cleaner Production*, 162, 1285-1296.
15. **Foereid B** 2017. Phosphorus availability in residues as fertilizers in organic agriculture. *Agricultural and Food Science*, 26, 25-33.
16. **Foereid B** 2015. X-ray computed tomography for root quantification. *Open Journal in Soil Science*, 5, 145-148.
17. **Foereid B**, Lehmann J, Wuster C, Bird M 2015. Presence of black carbon in soil due to forest fire in the New Jersey pine barrens. *Journal of Earth Science and Engineering*, 5, 91-97.
18. **Foereid B** 2015. Biochar in nutrient recycling – the effect and its use in wastewater treatment. *Open Journal in Soil Science*, 5, 39-44.
19. **Foereid B**, Ward DS, Mahowald N, Paterson E, Lehmann J 2014. The sensitivity of carbon turnover in the Community Land Model to modified assumptions about soil processes. *Earth System Dynamics*, 5, 211-221.
20. Palosuo T, **Foereid B**, Svensson M, Shurpali N, Lehtonen A, Herbst M, Linkosalo T, Ortiz C, Rampazzo Todorovic GTC, Marcinkonis S, Li C, Jandl R 2012. A multi-model comparison of soil

- carbon assessment of a coniferous forest stand. *Environmental Modelling and Software* 35, 38-49.
21. **Foereid B** 2012. Photodegradation for nutrient management in the dry tropics. *Open Journal in Soil Science*, 2, 17-19.
  22. **Foereid B**, Bellamy PH, Holden A, Kirk GJD 2012. On the initialization of soil carbon models and its effects on model predictions for England and Wales. *European Journal of Soil Science*, 63, 32-41.
  23. **Foereid B**, Lehmann J, Major J 2011. Modeling black carbon degradation and movement in soil. *Plant and Soil*, 345, 223-236.
  24. **Foereid B**, Rivero MJ, Primo O, Ortiz I 2011. Modelling photodegradation in the global carbon cycle. *Soil Biology & Biochemistry*, 43, 1383-1386.
  25. **Foereid B**, Bellarby J, Meier-Augenstein W, Kemp H 2010. Does light exposure make plant litter more degradable? *Plant and Soil*, 333, 275-285.
  26. Gottchalk P, Bellarby J, Chenu C, **Foereid B**, Smith P, Wattenbach M, Zingore S, Smith J, 2010. Simulation of soil organic carbon response at forest-cultivation sequence using <sup>13</sup>C measurements, *Organic Geochemistry*, 41, 41-54.
  27. **Foereid B**, Barthram GT, Marriott CA 2007. The CENTURY model failed to simulate soil organic matter development in a cool, moist, acidic grassland, *Nutrient Cycling in Agroecosystems*, 78, 143-153.
  28. **Foereid B**, Dawson LA, Johnson D, Rangel-Castro I-J 2006. Medium-term fate of carbon in upland grassland subjected to liming using *in situ* <sup>13</sup>CO<sub>2</sub> pulse-labelling. *Plant and Soil*, 287, 301-311.
  29. **Foereid B**, Yearsley JM 2004. Modelling carbon and nitrogen turnover in the rhizosphere and the impact of microbial grazers. *Plant and Soil*, 267, 329-342.
  30. **Foereid B**, de Neergaard A, Høgh-Jensen H 2004. Turnover of organic matter in a *Miscanthus* field: Effect of time in *Miscanthus* cultivation and inorganic nitrogen supply. *Soil Biology & Biochemistry*, 36, 1075-1085.
  31. **Foereid B**, Høgh-Jensen H 2004. Carbon sequestration potential of organic agriculture in northern Europe – a modelling approach. *Nutrient Cycling in Agroecosystems*, 68, 13-24.
  32. **Foereid B**, Bro R, Mogensen VO, Porter JR 2002. Effects of windbreak strips of willow coppice – modelling and field experiment on barley in Denmark. *Agriculture, Ecosystem & Environment*, 93, 25-32.
  33. **Foereid B**, Filho, W.L. 1997. Young people's attitudes towards and knowledge about the environment: an analysis based on TIMSS-data. *Scientia Paedagogia Experimentalis* 34, 231-244.

### **Scientific publications, book chapter published or accepted in refereed anthologies and monographs**

1. Barnes PW, Bornman JF, Pandey KK et al. 2022. Environmental Effects of Stratospheric Ozone Depletion, UV Radiation and Interactions with Climate Change: UNEP Environmental Effects Assessment Panel, Update 2021
2. Barnes PW, Bornman JF, Pandey KK et al. 2021. Environmental Effects of Stratospheric Ozone Depletion, UV Radiation, and Interactions with Climate Change: Update 2020.
3. Brown G, Cooper M, Kobayashi M et al. 2020. Chapter 4: Threats to soil biodiversity - global and regional trends. In: FAO, ITPS, GSBI, SCBD and EC. 2020. State of knowledge of soil biodiversity - Status, challenges and potentialities, Report 2020. Rome, FAO. <https://doi.org/10.4060/cb1928en>
4. **Foereid B** 2018. Organic fertilizers and nutrient recycling from diluted waste streams. In: *Fertilizers* Eds.: Issaka R, Buri MM. IntechOpen Science Publisher.
5. **Foereid B**, Harding K 2009. Soil organic matter in an altitudinal gradient. In: *Grassland*

Biodiversity, Runas J, Dahlgren T, Nova Science Publishers, Inc. Hauppauge, NY.

6. Bellarby J, **Foereid B**, Hastings A, Smith P 2008. Cool Farming: Climate impacts of agriculture and mitigation potential. Report for Greenpeace.
7. **Foereid, B** 2008. Can soil fertility be modelled? In: Soil Fertility, Lucero DP, Boggs JE (Eds.), Nova Science Publishers, Inc. Hauppauge, NY.
8. **Foereid B**, Erhart E, Schmid E, Hartl W 2008. Model simulation of carbon and nitrogen dynamics in a biowaste compost fertilisation experiment. In: Soil Fertility, Lucero DP, Boggs JE (Eds.), Nova Science Publishers, Inc. Hauppauge, NY.
9. **Foereid B** 2007. Estimating soil feedbacks to climate change. In: Cost Action 639: Greenhouse gas budget of soils under changing climate and land use (BurnOut) Eds. Jandl R and Olsson M.

### **Scientific presentations as published abstracts and proceedings from oral or poster presentations at international meetings - conference contributions**

1. **Foereid B**, Dietrich M, Paruch L 2023. Digestate use in rice cultivation – greenhouse gases, nitrogen and microbes. RAMIRAN conference, 11-14 September, 2023.
2. Dietrich M, Fongen M, **Foereid B** 2023. Greenhouse gas emissions from digestate composting. RAMIRAN conference, 11-14 September, 2023.
3. **Foereid B**, Aurdal SM, Nesse AS, Myrstad I, Hvoslef-Eide T, Dietrich M 2022. Peat replacement in horticulture – a Norwegian research perspective. Off the peat path, webinar.
4. Dietrich M, Fongen M, **Foereid B** 2022. Greenhouse gas emissions from digestate composting. Phosphorus in Europe Research Meeting, Vienna.
5. **Foereid B**, Dietrich M, Le Borgne A 2020. Modelling decomposition and microbial processes under waterlogging. Global Symposium on Soil Biodiversity FAO, Rome, Italy.
6. **Foereid B**, Le Borgne A, Solvåg Nesse A, Dietrich M 2019. Modelling carbon cycling in wetlands. Wetscapes conference, Rostock, Germany.
7. **Foereid B**, Alvarenga E, Szocs J, Makadi M 2018. Plant availability of sorbed nutrients. Proceeding from the 17th World Fertilizer congress, Shenyang, China Sept 3-7, 2018.
8. **Foereid B**, Øverli Kristoffersen A, Helmen HH 2018. Organic matter residue application – yield, organic matter microbial life. Proceeding from the 17th World Fertilizer congress, Shenyang, China Sept 3-7, 2018.
9. **Foereid B**, Øverli Kristoffersen A 2017. Effects of repeated digestate applications on soil properties, microbial communities and grain yield. Conference abstract, International Conference on Long-term field Experiments, 26-27. September 2017. Nyíregyháza, Hungary.
10. **Foereid B**, Zarov EA, Filippov IV, Lapshina ED 2014. Photo-expose affects subsequent peat decomposition. Paper for WSPCC symposium, Novosibirsk, Russia, 2014.
11. **Foereid B**, Ward D, Mahowald N, Paterson E, Lehmann J 2014. Upscaling the effect of priming on carbon turnover in the earth system Els 2014 – the Earth Living Skin: Soil, Life and Climate Changes, Bari, Italy.

### **Publications in other journals and books (business journals, grower's journals, popular science articles), leaflets etc. or electronic publications on the web etc.**

1. **Føreid B**, Thomson M 2023. Gjødsl fra fiskeoppdrett en gylden mulighet for sirkulær økonomi. Gartneryrket 09/2023.
2. **Foereid B**, Øgaard AF, Solli L, Bahr G, Johansen J, Eggen T, Vethe Ø 2022. Answer to EU Survey – fish sludge as fertiliser.

3. Norsk fiskeslam kan hjelpe på matmangel, men EU vil ikke gjødsle med det. *Forskning.no* 2022. Norwegian Fish sludge can help against food shortages, but the EU does not want to fertilise with it.
4. Forskere ble overrasket av skyhøye klimautslipp fra biogass-rester. *Forskning.no* 2021. Researchers were surprised by high climate gas emissions from biogas digestate.
5. **Foereid B**. Digestate – an undervalued resource turned problem? Experiences of a Norwegian researcher in India. *Biogas Magazine*, 2020.

### Technical reports, miscellaneous reports and course materials

1. Mæhlum T, **Foereid B**, Dietrich M, Mogens ME, Hvoslef-Eide T, Vethe OL, Jenssen PD 2023. D2.5 Quantitative and qualitative assessment of nutrients and energy. SiEUGreen report.
2. Paredes L, Akaboci T, **Foereid B**, Raynaud C, Candy L 2022. D4.1 Processes and technologies specification and set up of the different pilots to recover nutrients from aquaculture wastes. SEA2LAND report.
3. Eiter S, Fjellstad W, **Foereid B**, Hanserud OS, Mæhlum T 2022. Klima- og miljøkriterier i urbant landbruk - Faggrunnlag og anbefalinger for Oslo kommune. NIBIO Rapport 8, 18. Climate and environmental criteria for urban agriculture – Knowledge background and recommendations for the municipality of Oslo.
4. Linjordet R, **Foereid B**, Mogens ME, Morken J, Pandey MK 2019. Green Technology (T1) Ready. Deliverable 2.1. H2020 SiEUGreen report.
5. Mogens ME, **Foereid B**, Mæhlum T, Linjordet R, Pandey MK, Jenssen P 2019. D 2.3 Blue Technology (T2) Ready-1. H2020 SiEUGreen report.
6. Jenssen P, Mæhlum T, **Foereid B**, Linjordet R, Mogens ME, Paney MK 2019. Blue Technology (T2) Ready 2. H2020 SiEUGreen Report.
7. **Foereid B** 2017. Rapport om analyser av krypsiv og slam. Rapport til Fylkesmannen i Aust- og Vest-agder. Report of analysis of the aquatic plant *Juncus bulbosus* and sludge.
8. Haraldsen TK, **Foereid B**, Ericsson T 2016. Organic waste products from pulp production and salmon hatcheries at Follafooss. Options for treatment and recycling of organic matter and plant nutrients. NIBIO report, 2.
9. Haraldsen TK, **Foereid B** 2015. Nyttig bruk av organisk avfall. *Bioforsk Rapport*, 10, 57. Useful use of organic waste.
10. **Foereid B** 2014. PhD as Training to be a Researcher. Assignment for PG Cert, Dundee University.
11. **Foereid B** 2014. Statistics Teaching for the Real World. Assignment for PG Cert, University of Abertay Dundee.
12. **Foereid B**, Milne R, Smith P 2009. Development and testing of coupled soil and vegetation carbon process model (WP2.9 and 2.10). In: Dyson KE (Ed.) Inventory and projections of UK emissions by sources and removals by sinks due to land use, land use change and forestry. Defra, Climate, Energy, Science and Analysis Division, CEH, Edinburgh.
13. **Foereid B**, Milne R, Fung WS, Smith P 2008. Development and testing of coupled soil and vegetation carbon process model (WP2.9 and 2.10). In: Thomson, AM (Ed.) Inventory and projections of UK emissions by sources and removals by sinks due to land use, land use change and forestry. Defra, Climate, Energy, Science and Analysis Division, CEH, Edinburgh.
14. **Foereid B**, Milne R, Smith P 2007. Development and testing of coupled soil and vegetation carbon process model (WP2.9 and 2.10). In: Thomson AM & van Oijen M (Eds.) Inventory and projections of UK emissions by sources and removals by sinks due to land use, land use change and forestry. Defra, Climate, Energy, Science and Analysis Division, CEH, Edinburgh.

15. Smith P, Smith JU, Flynn H, Killham K, Rangel-Castro I, **Foereid B**, Aitkenhead M, Chapman S, Towers W, Bell J, Lumsdon D, Milne R, Thomson A, Simmons I, Skiba U, Reynolds B, Evans C, Frogbrook Z, Bradley I, Whitmore A, Falloon P 2007. ECOSSE: Estimating Carbon in Organic Soils - Sequestration and Emissions. Final Report. SEERAD Report. ISBN 978 0 7559 1498 2. 166pp.
16. Jones C, Falloon P, Smith JU, **Foereid B**, Smith P, Zhang C, Coleman K, Powlson D, Whitmore A 2006. Offline validation of the MAGEC Soil Nitrogen and Carbon model. Contract deliverable to DEFRA, 27.03.06.
17. **Foereid B** 2002. Temperate Agroforestry for Carbon Sequestration. Ph.D.-thesis, Royal Veterinary and Agricultural University, Copenhagen, Denmark.

**Interviews in media/web-news, radio/TV etc. or oral presentations at meetings, conferences etc.**

1. **Foereid B** 2023. SEA2LAND European project. Presentation at Sludge network meeting, Norwegian Centre of Expertise, Aquaculture
2. EA2LAND European project. Oral presentation online in Sludge Network Meeting, NCP Aquaculture.
3. **Foereid B** 2023. Fiskeslam som gjødsel – Fish sludge as fertiliser. Presentation Fedrikstad Seafoods.
4. **Foereid B** 2023. Fiskeslam i lovverk, Norge og EU – Fish sludge in legislation, Norway and EU. Presentation Fedrikstad Seafoods.
5. Mæhlum T **Foereid B** 2022. Lokale kretsløp og sirkulær økonomi i urbant landbruk – On-site recycling and circular economy in urban agriculture. Lecture to NMBU and NIBIO staff.
6. **Foereid B** 2022. Regulations on fish sludge. Webinar in SEA2LAND project.
7. **Foereid B** Mæhlum T 2021. Lokale kretsløp og sirkulær økonomi i urbant landbruk – On-site recycling and circular economy in urban agriculture. Lecture in course in urban agriculture MU300.