Diego Grados

As a bioscience engineer, agroecologist and applied statistician, my work centers on solving sustainable development challenges in agriculture. I use interdisciplinary approaches focusing on the basic and applied aspects of soil-plant-water-atmosphere interactions, agroecosystem analysis, process-based models and remote sensing. My experimental work spans tropical, semi-arid and temperate regions, targeting nitrogen and water cycling to improve agronomic practices. I am skilled in programming for data processing and process-based models, and I'm enthusiastic about creating integrated assessments that use novel data methods to transform information into knowledge.

Personal Data

Email:	diegogb@mit.edu | diegogradosb@agro.au.dk	ResearchID:	GYR-1584-2022
Web:	https://diegogradosb.github.io	ORCID:	0000-0001-5548-3204

Professional Experience

Oct 2024 - Present

Marie Skłodowska-Curie Postdoctoral Researcher - MASSACHUSETTS INSTITUTE OF TECHNOLOGY *(Climate, Environment and Life Science - Civil and Environmental Engineering Department)*, Massachusetts - United States of America

Assistant Professor (non-tenure track) - AARHUS UNIVERSITY *(Climate and Water - Agroecology Department - Faculty of Technical Sciences)*, Aarhus - Denmark

- I study the drivers of greenhouse gas emissions and mitigation practices for agroecosystems using multi-source data and multi-target methods from regional to global scale.
- Dissemination of results in seminars, peer-reviewed journals and international conferences.

Reference: Prof. César TERRER, Senior. Res. Diego ABALOS

Sep 2020 - Sep 2024

Postdoctoral Researcher - AARHUS UNIVERSITY, Aarhus - Denmark

Climate and Water - Agroecology Department - Faculty of Technical Sciences

- I studied mitigation practices for greenhouse gas emissions and adaptation practices to climate change for agroecosystems using multi-source data and multi-target methods from local to regional scale.
- I participated in international and national projects on experimentation, quantification and reduction of greenhouse gas emissions: PROENV, MACSUR SciPol, ZERO.
- Dissemination of results in seminars, peer-reviewed journals and international conferences.
- (Co-)supervision of 1 MSc and 3 PhD thesis students.
- I wrote 2 international project proposals.

Reference: Senior. Res. Diego ABALOS, Prof. Jørgen Eivind OLESEN

Jul 2023 - Ago 2023

Visiting Researcher - MASSACHUSETTS INSTITUTE OF TECHNOLOGY *(Faculty of Climate, Environment and Life Science)* and BOSTON COLLEGE *(Faculty of Earth and Environmental Sciences)*, Massachusetts - United States of America

- I started a collaboration on using machine-learning methods and terrestrial biosphere model *(Dynamic Land Ecosystem Model)* to assess nitrogen cycling, greenhouse gas emissions and crop production at continental and global scale.

Reference: Prof. César TERRER, Prof. Hanqin TIAN

Nov 2021 - Dec 2021

Visiting Researcher - KARLSRUHE INSTITUTE OF TECHNOLOGY, Garmisch-Partenkirchen - Germany

Institute of Meteorology and Climate Research, Atmospheric Environmental Research

- I started a collaboration on using the *LandscapeDNDC* terrestrial ecosystem model to simulate greenhouse gas emissions and crop production at local and regional scale.

Reference: Senior. Res. Edwin HAAS, Prof. Klaus BUTTERBACH-BAHL

Apr 2020 - Ago 2020

Unemployed

- I pursued research job opportunities while navigating the unforeseen challenges of the COVID-19 global pandemic.

Jan 2020 - Mar 2020

Researcher - KU LEUVEN, Leuven - Belgium

Biostatistics and Sustainability Groups - Biosystems Department - Faculty of Bioscience Engineering

Apr 2016 - Dec 2019

PhD Researcher - KU LEUVEN, Leuven - Belgium

Biostatistics and Sustainability Groups - Biosystems Department - Faculty of Bioscience Engineering
- I developed multi-target field and system modeling methodologies for the agroecosystems' sustainability assessment.
- Dissemination of results in seminars, workshops, peer-reviewed journals and international conferences.
- (Co-)supervision of 3 BSc and 4 MSc thesis students in Peru (UNALM and UNCP) and Belgium (KU Leuven).
- I wrote 1 international project proposal.

Reference: Prof. Eddie SCHREVENS

Nov 2014 - Apr 2019	**Research Assistant** - *VLIR/UOS-UNALM Project*, Lima - Peru *Strengthening of Smallholder Horticultural Systems Subproject* - I co-led a study on soil-plant-atmosphere interactions in Arid regions exploring management optimization options. - I (co-)designed, installed, sampled and analyzed agricultural experiments under drip fertigation systems. - I installed and monitored soil, climate and irrigation equipment. Reference: Prof. Eddie Schrevens, Prof. Guido Wyseure, Prof. Jan Diels
Sep 2013 - Dec 2018	**Research Officer** - *VLIR/UOS-UNALM Project*, Junin - Peru *Sustainable Agriculture in the Central Peruvian Andes Subproject* - I led agricultural experiments' design, installation, sampling and evaluation under rainfed smallholder conditions. - I consolidated databases, developed process-based models and statistical methods to assess ecosystem functioning. - I performed analysis using participatory approaches and biophysical techniques to quantify ecosystems services. Reference: Prof. Eddie Schrevens, Prof. Sady García
Feb 2013 - Apr 2019	**Research Officer** - *VLIR/UOS-UNALM Project*, Junin | Lima - Peru *Drone Technology in Agriculture Subproject* - I led the feasibility study for uses of drone technology and multispectral images in ecosystems. - I planned and executed drone flights in Mountain, Arid and Tropical Forest regions. - I developed mathematical-statistical frameworks for land use classification and the evaluation of field experiments. Reference: Prof. Eddie Schrevens, Senior R&D Dries Raymaekers
Jan 2012 - Dec 2018	**Research Officer** - *VLIR/UOS-UNALM Project*, Junin - Peru *Watersheds Management Subproject* - I led a study on soil-plant-atmosphere interactions and hydrology in Mountain regions. - I installed and monitored soil, climatological and hydrometric equipment. - I implemented databases, applied hydrological models and assessed rainfall-runoff relations. Reference: Prof. Eduardo Chávarri, Prof. Guido Wyseure

Education

Apr 2016 - Dec 2019	**PhD** in **Bioscience Engineering**, *Biostatistics and Sustainability* - KU Leuven, Belgium Thesis Title: "Multi-target methodologies for the improvement of agricultural systems research - *Study cases at system and field level*". | Advisor: Prof. Eddie Schrevens
Mar 2007 - Dec 2011	**BSc** in **Agricultural Engineering**, *Hydrology* - Agrarian National University La Molina , Peru Thesis Title: "Analysis of flood peaks in small Andean watersheds, Junin Department, Peru (2011-2012 Period)". | Advisor: Prof. Eduardo Chávarri

Publications

13. Vallicrosa, H., Fleischer, K., Baquerizo, M.D., Fernandez-Martinez, M., Černý, J., Tian, D., Kourmouli, A., Mayoral, C., **Grados, D.**, Lu, M., & Terrer, C. (2025). Nitrogen deposition and climate drive plant nitrogen uptake in terrestrial ecosystems. *Under review*. Preprint: https://doi.org/10.5194/egusphere-2024-3661.

12. **Grados, D.**, Einarsson, R., Sanz Cobeña, A., Olesen, J.E., Børsting, C.F., Abalos, D. (2024). Quantification and comparison of national and subnational agricultural nitrogen flows in Denmark and Sweden. *Environmental Research Letters, 20(5)*, 054041. https://doi.org/10.1088/1748-9326/adca4a.

11. Michailidis, V., Lugato, E., Panagos, P., **Grados, D.**, Freund, F., Jones, A., & Abalos, D. (2025). How do diet shifts affect the greenhouse gas balance of agricultural soils? Denmark as a case study. *Agricultural Systems, 224*, 104263. https://doi.org/10.1016/j.agsy.2025.104263.

10. **Grados, D.**, Kraus, D., Haas, E., Butterbach-Bahl, K., Olesen, J.E., & Abalos, D. (2024). Common agronomic adaptation strategies to climate change may increase soil greenhouse gas emission in Northern Europe. *Agricultural and Forest Meteorology, 349*, 109966. https://doi.org/10.1016/j.agrformet.2024.109966.

9. Rahimi, J., Haas, E., Clemens, S., **Grados, D.**, Abalos, D., Ojo Aderele, M., Blicher-Mathiesen, G., & Butterbach-Bahl, K. (2024). Aggregation of activity data on crop management can induce large uncertainties in estimates of regional nitrogen budgets. *npj Sustainable Agriculture, 2*, 7. https://doi.org/10.1038/s44264-024-00015-3.

8. Gutierrez, S., **Grados, D.**, Møller, A.B., de Carvalho Gomes, L., Beucher, A.M., Giannini Kurina, F., de Jonge, L.W., & Greve, M.H. (2023). Unleashing the sequestration potential of soil organic carbon under climate and land use change scenarios in Danish agroecosystems. *Science of The Total Environment, 905*, 166921. https://doi.org/10.1016/j.scitotenv.2023.166921.

7. Siddique, I.A., **Grados, D.,** Chen, J., Lærke, P.E., & Jørgensen, U. (2023). Soil organic carbon stock change following perennialization: A meta-analysis. *Agronomy for Sustainable Development, 43(5)*, 58. https://doi.org/10.1007/s13593-023-00912-w.

6. **Grados, D.,** Butterbach-Bahl, K., Chen, J., Van Groenigen, K.J., Olesen, J.E., Van Groenigen, J.W., & Abalos, D. (2022). Synthesizing the evidence of nitrous oxide mitigation practices in agroecosystems. *Environmental Research Letters, 17(11)*, 114024. https://doi.org/10.1088/1748-9326/ac9b50.

5. Garcia-Garcia, D., Reynafarje, X., **Grados, D.,** & Schrevens, E. (2021). Linear mixed model analysis of NDVI-based canopy coverage, extracted from sequential UAV multispectral imagery of an open field tomato irrigation experiment. *Computers and Electronics in Agriculture, 189*, 106399. https://doi.org/10.1016/j.compag.2021.106399.

4. **Grados, D.,** & Schrevens, E. (2020). Cassava NDVI analysis: A nonlinear mixed model approach based on UAV-imagery. *PFG - Journal of Photogrammetry, Remote Sensing and Geoinformation Science, 88(3)*, 337–347. http://doi.org/10.1007/s41064-020-00116-x.

3. **Grados, D.,** García, S., & Schrevens, E. (2020). Assessing the potato yield gap in the Peruvian Central Andes. *Agricultural Systems, 181*, 102817. http://doi.org/10.1016/j.agsy.2020.102817.

2. **Grados, D.,** Reynafarje, X., & Schrevens, E. (2020). A methodological approach to assess canopy NDVI-based tomato dynamics under irrigation treatments. *Agricultural Water Management, 240*, 106208. http://doi.org/10.1016/j.agwat.2020.106208.

1. **Grados, D.,** & Schrevens, E. (2019). Multidimensional analysis of environmental impacts from potato agricultural production in the Peruvian Central Andes. *Science of The Total Environment, 663*, 927–934. http://doi.org/10.1016/j.scitotenv.2019.01.414.

Conference Proceedings [Peer-Reviewed]

6. **Grados, D.,** Heuts, R., García, S., & Schrevens, E. (2021). Exploring biophysical components in rain-fed potato systems in the Peruvian Central Andes. *Acta Horticulturae, 1326, 247-254. South-Eastern Europe Symposium on Vegetables & Potatoes*, Maribor - Slovenia, Jun 2017. https://doi.org/10.17660/actahortic.2021.1326.33.

5. Schrevens, E., Heuts, R., Reynafarje, X., **Grados, D.,** & Diels, J. (2019). Potential strategies to reduce nitrogen emissions to the environment in an intensive cauliflower-leek rotation system: A modelling approach. *Acta Horticulturae (1253, 269–278). International Symposium on Water and Nutrient Relations and Management of Horticultural Crops*, Istanbul - Turkey, Aug 2018. http://doi.org/10.17660/actahortic.2019.1253.36.

4. **Grados, D.,** García, S., & Schrevens, E. (2019). Nitrogen and water use efficiency under rain-fed potato agriculture: An experimental study. *Acta Horticulturae (1253, 243–252). International Symposium on Water and Nutrient Relations and Management of Horticultural Crops*, Istanbul - Turkey, Aug 2018. http://doi.org/10.17660/actahortic.2019.1253.33.

3. Reynafarje, X., **Grados, D.,** Casas, A. &, Schrevens, E. (2019). Effect of water stress after flowering stage on tomato crop yield and soil water content in the semi-arid Peruvian coastline. *Acta Horticulturae (1253, 279–286). International Symposium on Water and Nutrient Relations and Management of Horticultural Crops*, Istanbul - Turkey, Aug 2018. http://doi.org/10.17660/actahortic.2019.1253.37.

2. **Grados, D.,** Vetters, E., Heuts, R., & Schrevens, E. (2017). A model based technical sustainability analysis of potato production systems in the Mantaro Valley, Central Highlands, Peru. *Acta Horticulturae (1154, 155-152). Symposium on Applications of Modelling as an Innovative Technology in the Horticultural Supply Chain*, Wageningen - The Netherlands, Oct 2015. http://doi.org/10.17660/actahortic.2017.1154.20.

1. **Grados, D.,** Vera, J., & Schrevens, E. (2016). Corn-faba bean associations in the Peruvian Central Andes. *Acta Horticulturae (1128, 79-88). International Symposium on Horticulture in Developing Countries and World Food Production*, Brisbane - Australia, Aug 2014. http://doi.org/10.17660/actahortic.2016.1128.11.

Conference Abstracts - Oral Presentations

9. **Grados, D.,** Einarsson, R., Sanz Cobeña, A., & Abalos, D. (2024). Development and evaluation of agricultural nitrogen budgets in Denmark and Sweden. *International Nitrogen Workshop.* Aarhus - Denmark, Jun 2024.

8. Michailidis, V., Lugato, E., Panagos, P., **Grados, D.**, Freund, F., Jones, A., & Abalos, D. (2024). How do diet shifts affect the greenhouse gas balance of agricultural soils? Denmark as a case study. *International Nitrogen Workshop*. Aarhus - Denmark, Jun 2024.

7. **Grados, D.**, Butterbach-Bahl, K., Chen, J., Van Groenigen, K.J., Olesen, J.E., Van Groenigen, J.W., & Abalos, D. (2023). Synthesizing the evidence of nitrous oxide mitigation practices in agroecosystems. *International Symposium on Non-CO$_2$ Greenhouse Gases*. Amsterdam - the Netherlands, Jun 2023.

6. **Grados, D.**, Butterbach-Bahl, K., Chen, J., Van Groenigen, K.J., Olesen, J.E., Van Groenigen, J.W., & Abalos, D. (2022). Synthesizing the evidence of nitrous oxide mitigation practices in agroecosystems. *Zero Greenhouse Gas Emission in High Productive Agriculture*. Copenhagen - Denmark, May 2022.

5. **Grados, D.**, Gil, R., Raymaekers, D., & Schrevens, E. (2017). Developing of an automated UAV-based RGB imagery workflow analysis for land use evaluation. *European Federation for Information Technology in Agriculture, Food and the Environment*. Montpellier - France, Jul. 2017.

4. **Grados, D.**, Heuts, R., García, S., & Schrevens, E. (2017). Exploring biophysical components in rain-fed potato systems in the Peruvian Central Andes. *South-Eastern Europe Symposium on Vegetables & Potatoes*. Maribor - Slovenia, Jun 2017.

3. Reynafarje, X., **Grados, D.**, Casas, A., & Schrevens, E. (2017). Effect of deficit irrigation and soil water content on tomato yield in the Peruvian Semi-arid Coastline. *South-Eastern Europe Symposium on Vegetables & Potatoes*. Maribor - Slovenia, Jun 2017.

2. **Grados, D.**, Raymaekers, D., Biesemans, J., & Schrevens, E. (2016). Use of UAV-based RGB imagery in agroecosystems research: a first approach towards land use classification. *National Symposium on Applied Biological Sciences*. Antwerp - Belgium, Feb 2016.

1. **Grados, D.**, Raymaekers, D., Biesemans, J., & Schrevens, E. (2015). Land use evaluation based on Unmanned Aerial Vehicles (UAV, DRONE) data: clustering superpixels for orthophoto segmentation. *European Network for Business and Industrial Statistics Spring Meeting*. Barcelona - Spain, Jun 2015.

Conference Abstracts - Poster Presentations

6. Abalos, D., Butterbach-Bahl, K., Rahimi, J., Haas, E., Kraus, D., **Grados, D.**, Beucher,A.M., & Olesen, J.E. (2024). Towards a Tier 3 inventory for soil N$_2$O emissions in Denmark. *American Geophysical Union*. Washington D.C. - United States, Dec 2024.

5. Siddique, I.A., **Grados, D.**, Chen, J., Lærke, P.E., & Jørgensen, U. (2024). Soil organic carbon stock change following perennialization: a meta-analysis. *International Symposium on Soil Carbon in the Ecological Transition*. Paris - France, Jan 2024.

4. Schrevens, E., Garcia-Garcia, D., Reynafarje, X., & **Grados, D.** (2022). Linear mixed model analysis of NDVI-based canopy coverage, extracted from sequential UAV multispectral imagery of an open field tomato irrigation experiment. *International Symposium on Innovative Technologies and Production Strategies for Sustainable Controlled Environment Horticulture*. Angers - France, Ago 2022.

3. **Grados, D.**, Olesen, J.E., & Abalos, D. (2021). Developing a data and modelling framework for assessing greenhouse gas mitigation strategies. *National Seminar on Technologies for a Danish Zero Greenhouse Gas Emission Agriculture*. Middelfart - Denmark, Jun 2021.

2. **Grados, D.**, Reynafarje, X., Vera, J., & Schrevens, E. (2014). Soil water balance modeling in the Peruvian Central Andes: a first approach. *Latin American Soil Science Congress*. Cusco - Peru, Nov 2014.

1. Reynafarje, X., **Grados, D.**, Vera, J., Vetters, E., & Schrevens, E. (2014). Optimal fertilization to improve potato production in the Peruvian Central Andes. *Latin American Soil Science Congress*. Cusco - Peru, Nov 2014.

Teaching Experience

2021 - 2024	Carbon Cycling and Climate Change (10 ECTS) - Master in Agrobiology, **Aarhus University**	

Teacher Assistant: I lectured sessions on soil nitrogen and carbon cycling, and greenhouse gas emissions. I guided students during the discussion and practical sessions to assess natural and managed ecosystems. I supported them in the development of their final research papers. [20 students]

2017 - 2020 Applied Multivariate Statistical Analysis (5 ECTS) - Master in Bioscience Engineering, **KU Leuven**
Teacher Assistant: I taught students how to analyze their databases using statistical software by leading R-tutorials. I was responsible for the practical sessions on data wrangling and visualization, matrix algebra, R-programming and advanced multivariate techniques. [80 students]

2019 Biological Production Systems (6 ECTS) - Bachelor in Bioscience Engineering, **KU Leuven**
Teacher Assistant: I guided students during discussions and practical sessions to assess agroecosystems. I taught them the essentials of process-based ecosystem modeling and supported them in developing their final research papers. [25 students]

2016 Ecosystems Modelling (5 ECTS) - Master in Bioscience Engineering, **KU Leuven**
Teacher Assistant: I taught students how to develop and use ecosystem models at diverse scales by leading R-tutorials. I guided the practical sessions on mathematical and statistical concepts, data wrangling and visualization, and R-programming. I taught them the fundamental topics of process-based ecosystem modeling: identification, implementation, calibration and validation. [10 students]

(Co-)supervision of Students

- **4 PhD** Thesis: Vasilis Michailidis (2022 - 2024), Imran Siddique (2023) and Sebastian Gutierrez (2023) in Aarhus University | Ximena Reynafarje (2020) in KU Leuven.

- **5 MSc** Thesis: Jenar Ahmad (2021) in Aarhus University | Noémie Hisette (2016), Eline Vetters (2014) and Geerard De Clerck (2014) in KU Leuven | Jesús Vera (2018) in Agrarian National University La Molina.

- **3 BSc** Thesis: Anthony Camones (2015) in Agrarian National University La Molina | David Vilcahuaman (2019) and Rusbel Gutierrez (2015) in National University of the Center of Peru.

Fellowships and Grants

2024	**Marie Skłodowska-Curie Postdoctoral Fellowship** at Massachusetts Institute of Technology, Boston College and Aarhus University (310 000€)
2024	**Novo Nordisk Foundation Postdoctoral Fellowship** at Massachusetts Institute of Technology and Aarhus University (402 000€) - (declined)
2023	**Land-CRAFT Grant** at Massachusetts Institute of Technology and Boston College (6 000€)
2022	**Aarhus University Travel Conference Grant** (400€)
2021	**iClimate Grant** at Karlsruhe Institute of Technology (3 600€)
2020	**FONDECYT-CONCYTEC Grant** at KU Leuven (5 500€)
2016 - 2019	**VLIR-UOS PhD Fellowship** at KU Leuven (82 000€)
2013 | 2014 | 2015	**VLIR-UOS International Scholar Fellowships** at KU Leuven (67 000€)

Ad-Hoc Reviewer

Agriculture, Ecosystems & Environment, *Agricultural Systems*, *Agronomy for Sustainable Development*, *European Journal of Agronomy*, *European Journal of Soil Science*, *Field Crops Research*, *Geoderma*, *Journal of Cleaner Production*, *Journal of Environmental Management*, *One Earth*, *Plant and Soil*, *Soil Use and Management*, and *Theoretical and Applied Climatology*.

International Seminars

• **Instructor** and **Co-organizer** of *Statistical Research Planning*. National Agrarian University La Molina | North-South-South – VLIR-IUC Cooperation, Lima - Peru, Mar 2015.

• **Instructor** and **Co-organizer** of *Introduction to Experimental Design Analysis*. Faculty of Agricultural Science - University of Cuenca | North-South-South – VLIR-IUC Cooperation, Cuenca - Ecuador, Sep 2014.

Outreach

5. **Grados, D.,** Practices to mitigate nitrous oxide emissions from agroecosystems. Klimatorium, Viborg - Denmark, Ago 2023.

4. **Grados, D.,** Measures for reducing nitrous oxide from agricultural soils. Farmbrella, Viborg - Denmark, Nov 2022.

3. **Grados, D.,** Olesen, J.E., Abalos, D., Tackling emissions of nitrous oxide from agroecosystems. SustES Bořetice meeting. Bořetice - Czech Republic, Apr 2022. *Invited speaker*.

2. **Grados, D.,** Multi-target methodologies for agroecosystems research. Postgraduate School of Agrarian National University La Molina. Online, Feb 2021. *Invited speaker*.

1. **Grados, D.,** Schrevens, E., Farming systems research in Peru - VLIR-UOS Collaboration. Bozar, Brussels - Belgium, Dec 2018. *Invited speaker*.

Languages

English: Full professional proficiency
French: Limited working proficiency

Dutch: Elementary working proficiency
Spanish: Native

Technical Skills

Programming: R, Python
Markup: Markdown, LaTeX
Other: RStudio, Spyder, Shiny, Office, QGIS, ArcGIS, Git/GitHub, HTML/CSS, Open Science Framework, Adobe Ilustrator