

# CAROLE DALIN

## PROFESSIONAL EXPERIENCE

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<b>CNRS Researcher</b> Laboratoire de Géologie, Département de Géosciences, École normale supérieure	since 10/2023
<b>Researcher, PI of ERC Starting Grant</b> Sustainable Food Systems Département de Géosciences, École normale supérieure	since 10/2022
<b>Assistant Professor then Associate Professor</b> Research on food sustainability Institute for Sustainable Resources, University College London	since 2016
<b>Postdoctoral Researcher</b> African Hydro-Economy & Water Security Grantham Research Institute on Climate and the Environment, LSE	2014-2016
<b>Research Assistant</b> Doctoral research on policy & water resources for food Environmental Engineering & Water Resources, Princeton University	2009-2014

## EDUCATION

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### **Princeton University 2009-2014**

Ph.D. (2014) and M.A. (2011) in Environmental Engineering & Water Resources  
Certificate in Science, Technology & Environmental Policy (2014)

### **École Centrale de Paris 2007-2011**

Diplôme d'Ingénieur de l'École Centrale de Paris (2011) and Bachelor of Sciences (2009)  
Majors: Environmental Sciences, Energy. Minors: Physics, Economics, Finance & Management.

### **Lycée Louis le Grand, Paris (PCSI/PC\*) 2005-2007**

## GRANTS AND AWARDS (selection)

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<b>co-I</b> , “Transitions to carbon-neutral food systems: preferences, welfare & policies” <i>PEPR FairCarbon - Agence Nationale de la Recherche</i> (€1.244K)	<b>2024-2029</b>
<b>Named Research Collaborator</b> , “AgriPV-ER” <i>PEPR TASE</i>	<b>2023-2026</b>
<b>Named Research Collaborator</b> , “Sustainable and Healthy Food Systems 2” <i>Wellcome Trust</i> (Total value: £7,000K)	<b>2023-2029</b>
<b>PI</b> , “Sustainable and healthy food solutions: system dynamics and trade-offs” <i>European Research Council</i> ERC Starting Grant (€1.500K)	<b>2022-2027</b>
<b>co-PI</b> , “Revealing the interactions between global biodiversity change and food security” <i>Natural Environment Research Council</i> (£606K)	2018-2021
<b>Named Research Collaborator</b> , “Sustainable and Healthy Food Systems” <i>Wellcome Trust</i> (Total value: £5,000K)	2017-2021
<b>PI</b> , NERC Independent Research Fellowship: “Developing integrated environmental indicators for sustainable global food production and trade” <i>Natural Environment Research Council</i> (£586K)	2016-2021
<b>PI</b> , Hack '69 Graduate Award, <i>Princeton Environmental Institute</i> (\$8K)	2013-14
<b>Scholar</b> in Global Systemic Risk, <i>Princeton Institute for International Studies</i> (\$10K)	2013-14
<b>Prize Awardee</b> , Wu Prize for Excellence, <i>Princeton University</i> (\$4K)	2013
<b>PI</b> , Science Technology and Environmental Policy Fellowship <i>Princeton Environmental Institute</i> (\$80K)	2012-14
<b>Scholar and Project Chair</b> , <i>Princeton Energy &amp; Climate Scholars</i> (\$16K)	2012-14

## RESEARCH EXPERIENCE (selection)

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- Geosciences Department, Ecole normale supérieure** since 2022  
PI and research group leader on the environmental sustainability of global food systems
- Institute for Sustainable Resources, University College London** since 2016  
PI and research group leader on the environmental sustainability of global food systems
- Grantham Research Institute, London School of Economics** 2014-2016  
Postdoctoral work on climate & water-energy-food nexus in southern Africa, with Prof. D. Conway
- School of Engineering & Applied Sciences - Woodrow Wilson School of Public & International Affairs, Princeton University** 2009-2014  
Ph.D. Thesis: “Water for food: evolution and projections of water transfers through international and domestic agricultural trade.”, supervised by Prof. I. Rodríguez-Iturbe and Prof. D. Mauzerall

## PEER-REVIEWED PUBLICATIONS

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Published articles: [find all PDFs at <https://www.lmd.ens.fr/dalin>]

39. Boakes, E.H., **Dalin**, C., Etard, A. et al. (2024) Impacts of the global food system on terrestrial biodiversity from land use and climate change. *Nature Communications*
38. Romanello M., ..., C **Dalin** et al. The 2023 report of the Lancet Countdown on health and climate change: the imperative for a health-centred response in a world facing irreversible harms. *The Lancet*
37. Springmann M, H Kennard, **C Dalin**, F Freund (2023) The contribution of international food trade to dietary risks and mortality at global, regional, and national levels. *Nature Food*
36. Gonzalez Zapata J, B Vangipuram, **C Dalin** and T Erfani (2023) Water Quality and Pollution Trading: A Sustainable Solution for Future Food Production. *ES&T Engineering*.
35. Wang J, M Konar, **C Dalin** et al. (2022) Economic and virtual water multilayer networks in China. *Journal of Cleaner Production*.
34. Romanello M, , ..., **C Dalin** et al. (2022) The 2022 report of the Lancet Countdown on health and climate change: health at the mercy of fossil fuels. *The Lancet*.
33. Davis, K. F., **C Dalin**, Kumm, M., Marston, L., Pingali, P., & Tuninetti, M. (2022). Beyond the Green Revolution: A roadmap for sustainable food systems research and action. *Environmental Research Letters* 17(10).
32. Jwaideh, M. A. A., Sutanudjaja, E. H., & **C Dalin** (2022). **Global impacts of nitrogen and phosphorus fertiliser use for major crops on aquatic biodiversity**. *International Journal of Life Cycle Assessment*.
31. Bonetti, S, EH Sutanudjaja, T Mabhaudhi, R Slotow and **C Dalin** (2022) **Climate change impacts on water sustainability of South African crop production**. *Environmental Research Letters*.
30. Outhwaite C, M Ortiz, F Spooner, **C Dalin** and T Newbold (2022) Availability and proximity of natural habitat influences cropland biodiversity in forest biomes. *Global Ecology and Biogeography*.
29. Falloon P, D. Bebbber, **C Dalin** et al. (2022) What do changing weather and climate shocks and stresses mean for the UK food system? *Environmental Research Letters*.
28. Romanello M, ..., **C Dalin** et al. (2021) The 2021 report of the Lancet Countdown on health & climate change: code red for a healthy future. *The Lancet*.

27. Zhang X., G. Yao, S. Vishwakarma, **C. Dalin** et al. (2021) Quantitative assessment of agricultural sustainability reveals divergent priorities among nations. *One Earth* 4 (9).
26. Mugiy H, ..., **C. Dalin**, et al. (2021) Multi-criteria suitability analysis for neglected and underutilised crop species in South Africa. *PLoS One*.
25. Ortiz M., C. Outhwaite, **C. Dalin** and T. Newbold (2021) A review of the interactions between biodiversity, agriculture, climate change, and international trade: research and policy priorities. *One Earth* 4 (1).
24. Harris F., **C. Dalin** et al. (2020) Trading water: virtual water flows through interstate cereal trade in India. *Environmental Research Letters* 15.
23. Watts N, ... , **C Dalin** et al. (2020) The 2020 report of The Lancet Countdown on health and climate change. *The Lancet* 397 (10269).
22. Siderius C., D. Conway, M. Yassine, L. Murken, P. Lostis & **C. Dalin** (2020) **Multi-scale analysis of the water-energy-food nexus in the Gulf region**. *Environ Res Lett* 15.
21. Gumidyala, S., Ruess, P. J., Konar, M., Marston, L., **Dalin, C.** & Wada, Y. (2020). Groundwater depletion embedded in domestic transfers and international exports of the United States. *Water Resources Research* 56.
20. **Dalin, C.**, C. Outhwaite (2019) **Impacts of global food systems on biodiversity and water: the vision of two reports and future aims**. *One Earth*, Cell Press 1 (3) 298-302. Invited
19. Watts N, ... , **C Dalin** et al. (2019) The 2019 report of The Lancet Countdown on health and climate change: ensuring that the health of a child born today is not defined by a changing climate. *The Lancet* 394 (10211) 1836-78.
18. Vanham, D., (...) **C. Dalin** et al. (2019) Environmental footprint family to address local to planetary sustainability and deliver on the SDGs. *Science of the Total Environment* 693.
17. **Dalin, C.**, M. Taniguchi and T. Green (2019) **Unsustainable groundwater use for global food production and related international trade**. *Global Sustainability*, Cambridge University Press Invited
16. Kayatz, B., F. Harris, J. Hillier, T. Adhya, **C. Dalin**, D. Nayak, R. Green, P. Smith and A. Dangour (2019) More crop per drop: Exploring India's cereal water use since 2005. *Science of the Total Environment* 673, 207-217.
15. Tuninetti, M., S. Tamea and **C. Dalin** (2019) **Water Debt indicator reveals where agricultural water use exceeds sustainable levels**. *Water Resources Research* 19 Feb 2019.
14. D'Odorico, P., **C. Dalin**, Carr, J., DellAngelo, J., Konar, M., Laio, F., Ridolfi, L., Rosa, L., Suweis, S., Tamea, S. and Tuninetti, M. (2019) Global virtual water trade and the hydrological cycle: Patterns, drivers, and socio-environmental impacts. *Environmental Research Letters* 11 February 2019.
13. Peng, W., Wagner F, Ramana MV, Zhai H, Small M, **C. Dalin**, Zhang X and Mauzerall D (2018) Managing China's coal-dominated power system for CO<sub>2</sub>, air pollution and water objectives. *Nature Sustainability* 1, 693-701.
12. Conway, D., W. Landman, **C. Dalin** and T. Osborn (2017) Hydropower plans in eastern and southern Africa increase risk of concurrent climate-related electricity supply disruption. *Nature Energy* 2, 946-953.
11. **Dalin, C.**, Y. Wada, T. Kastner and M. Puma (2017) **Groundwater depletion embedded in international food trade**. *Nature* 543, 700-704.
10. **Dalin, C.** and I. Rodriguez-Iturbe (2016) **Environmental impacts of food trade via resource use and greenhouse gas emissions** *Environmental Research Letters* 11, 3, 5012 Invited

9. **Dalin, C.** and D. Conway (2016) **Water resources transfers through southern African food trade: water efficiency & climate signals.** *Environmental Research Letters* 11, 1, 5005.
8. Conway, D., E. Archer, D. Deryng, S. Dorling, T. Krueger, W. Landman, B. Lankford, K. Lebek, T. J. Osborn, C. Ringler, J. Thurlow, T. Zhu and **C. Dalin** (2015) Climate and southern Africa's water-energy-food nexus. *Nature Climate Change* 5, 837-846.
7. **Dalin, C.**, H. Qiu, N. Hanasaki, D. Mauzerall and I. Rodriguez-Iturbe (2015) **Balancing water resource conservation and food security in China.** *Proceedings of the National Academy of Sciences* Early Edition March 30, 2015
6. **Dalin, C.**, N. Hanasaki, H. Qiu, D. Mauzerall and I. Rodriguez-Iturbe (2014) **Water resources transfers through Chinese interprovincial and foreign food trade.** *Proceedings of the National Academy of Sciences* 111, 27, 9774-97794.
5. **Dalin, C.**, M. Konar, S. Suweis, N. Hanasaki and I. Rodriguez-Iturbe (2012) **Modeling past and future structure of the global virtual water trade network.** *Geophysical Research Letters* 39, L24402.
4. **Dalin, C.**, M. Konar, N. Hanasaki, A. Rinaldo and I. Rodriguez-Iturbe (2012) **Evolution of the global virtual water trade network.** *Proceedings of the National Academy of Sciences* 109, 16, 5989-5994.
3. Konar, M., **C. Dalin**, N. Hanasaki, A. Rinaldo and I. Rodriguez-Iturbe (2012) Temporal dynamics of blue and green virtual water trade networks. *Water Resources Research* 48, W07509.
2. Suweis, S., M. Konar, **C. Dalin**, N. Hanasaki, A. Rinaldo, and I. Rodriguez-Iturbe (2011) Structure and controls of the global virtual water trade network. *Geophysical Research Letters* 38, L10403.
1. Konar, M., **C. Dalin**, S. Suweis, N. Hanasaki, A. Rinaldo and I. Rodriguez-Iturbe (2011) Water for food: The global virtual water trade network. *Water Resources Research* 47, W05520.

#### Published book chapters:

5. **Dalin, C.** **Groundwater global sustainability and agricultural trade.** in Global Groundwater: Source, Scarcity, Sustainability, Security and Solutions (2020) ed. by Mukherjee A., B. Scanlon et al. *Elsevier* ISBN 9780128181720 Invited
4. **Dalin, C.** **A water perspective on the water-energy-food nexus.** in Handbook of Nature, edited by T. Marsden, *SAGE* (2018) Invited
3. **Dalin, C.** and M. Konar (2018) **Virtual water trade among world countries associated with food trade** in Encyclopedia of Food Security and Sustainability, edited by A. Galli et al., *Elsevier* Invited
2. Davis, K., **C. Dalin**, R. DeFries, J. Galloway, A. Leach and N. Mueller (2018) Sustainable Pathways for Meeting Future Food Demand in Encyclopedia of Food Security and Sustainability, edited by A. Galli et al., *Elsevier* Invited
1. Andrews-Speed, P. and **C. Dalin** (2017) Elements of the Water-Energy-Food nexus in China. in Handbook on the Resource Nexus, edited by R. Bleischwitz, *Routledge/Earthscan*

#### SELECTED PRESENTATIONS (\*=invited)

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**Environmental stressors from food production worldwide:** CERES (ENS) 01/24, INRAE 04/22; Paris School of Economics 05/22; Geography Seminar, University of Delaware (USA) 11/22; Environmental Policy Seminar, Princeton (USA) 02/22; LEAP Conference, Oxford (UK) 11/18; AGU Fall Meeting (USA) 12/18; IIASA seminar series (Austria) 03/19; EGU General Assembly (Austria)

04/19.

**Sustainability of agricultural water use worldwide:**

OpenAg Symposium at Oxford University (UK) 09/24; EGU Assembly (Austria) 04/18; GEWEX Science Conference (Canada) 05/18; AGU Chapman on Aquifer Sustainability (Spain) 10/19\*  
Invited keynote speaker.

**Agriculture & global biodiversity change:** OSM Global Land Programme (Switzerland) 04/19\*.

**Who is eating up the world's aquifers?:** European Commission Joint Research Centre (Italy), 01/17\*; AGU Fall Meeting (USA) 12/16; OECD Water Workshop (USA) 09/16\*; ETH Zurich (Switzerland) 09/16\*; EGU Assembly (Austria) 04/16; Agriwat (Netherlands) 03/16.

**Water for food: drivers and impacts of virtual water trade,** *Food, Climate and Society Seminar Series*, University of Sussex (U.K.) 02/16\*.

**Water resources transfers through southern African food trade: water efficiency and climate signals:** AGU Fall Meeting (USA) 12/15; EGU Assembly (Austria) 04/15; Climate Smart Agriculture (France) 03/15.

**Climate and the water-energy-food nexus,** *Our Common Future Under Climate Change International Scientific Conference*, Paris, France, July 2015. Invited keynote speaker

**Balancing water resources conservation and food security in China,** *Annual Conference of the European Association of Environmental and Resource Economists* (Finland) 06/15; *Earth System Science Seminar Series*, University of California, Irvine (USA) 04/15\*.

**Projections of virtual water trade under agricultural policy scenarios in China,** *AGU Fall Meeting* (USA) 12/14.\*

**China's agriculture, water resources and trade: policy implications,** *Hydrological & Food Security Forecasting Workshop*, Princeton Global Collaborative Network (Kenya) 08/14.\*

**Modeling past and future structure of the global virtual water trade network,** *AGU Fall Meeting* (USA) 12/12.

**The growing role of China in global virtual water transfers,** BNU-Princeton Workshop on Water, Climate Change & Food Security; Tsinghua University (China) 05/12.\*

**Dynamics of the global virtual water trade network,** AGU Fall Meeting (USA) 12/11.

Lead Convener Scientific Session **Sustainable Food Systems**, *EGU* 04/23, *EGU* 04/21, *EGU* 05/20, *AGU* 12/20.

Co-convenor Scientific Session **The Human-Climate-Water Nexus, Climate Change and Water Security**, *GEWEX Science Conference* 05/18.\*

Scientific Session Chair **Food security and the water-energy-food nexus**, *AGU* 12/15.

Invited Panelist **"The thirsty 10 billion" Great Debate**, EGU Assembly (Austria) 04/15.

Lead Convener Scientific Session **Trade & the Environment**, *AGU* 12/12.

## EDITORIAL ACTIVITY

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**Editor** of *Earth's Future*, AGU/Wiley, since 04/2020.

**Reviewer** for:

Journals: *Advances in Water Resources Research*; *Environmental Research Letters*; *Environment, Development and Sustainability*; *Food Security*; *Global Environmental Change*; *Hydrology & Earth System Sciences*; *Journal of Hydrology*; *Nature*; *Nature Geosciences*; *Nature Sustainability*; *Nature Reports*; *PLOS-ONE*; *Science*; *Science Advances*; *Sustainability*; *Water*; *Water Resources Research*; *World Development*

Funding bodies: *NERC* (U.K. Natural Environment Research Council); *NSERC* (Natural Sciences and Engineering Research Council of Canada); *NSF* (U.S.A. National Science Foundation)

## RESEARCH ADMINISTRATION AND TEACHING (selection)

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– **Groupe de Travail Égalité-Diversité**, Département de Géosciences de l'ENS since 2022

- Research Director, Institute for Sustainable Resources, University College London, 2021-2022  
Deputy Research Director 2019-2021 - research strategy, preparation of the Faculty's submission to the U.K. national Research Excellence Framework (REF) assessment
- Ecole doctorale Sciences de l'environnement d'Ile-de-France (129), 2023-now - **Ph.D. supervisor**  
**Belen Benitez** (started 2023) - ERC FLORA studentship on Sustainable Food Systems (co-supervised with Bertrand Guenet)
- Ph.D. in Sustainable Resources, University College London, 2017-now - **Ph.D. supervisor**  
**Gideon Mensah-Commey** (started 2021) - Impacts of export-driven banana production in Ghana on biodiversity. Center for Doctoral Training on UK Food Systems (UKFS CDT)  
**Carolina Campos** (started Nov. 2020) - Impacts of human activities on global biodiversity.  
**Arianna Buratto** (2019-2023) - EPSRC Studentship on Behavioral economics of food production and consumption for environmental sustainability  
**Mark Jwaideh** (2017-2022) - EPSRC Studentship on Freshwater and marine impacts of fertiliser used in agriculture worldwide
- Ecole Polytechnique, 2022-now - Invited lecturer
- MSc. in Sustainable Resources, University College London, 2016-now - Master thesis supervisor
- MSc. in Sustainable Resources, University College London, 2016-now - Invited lecturer